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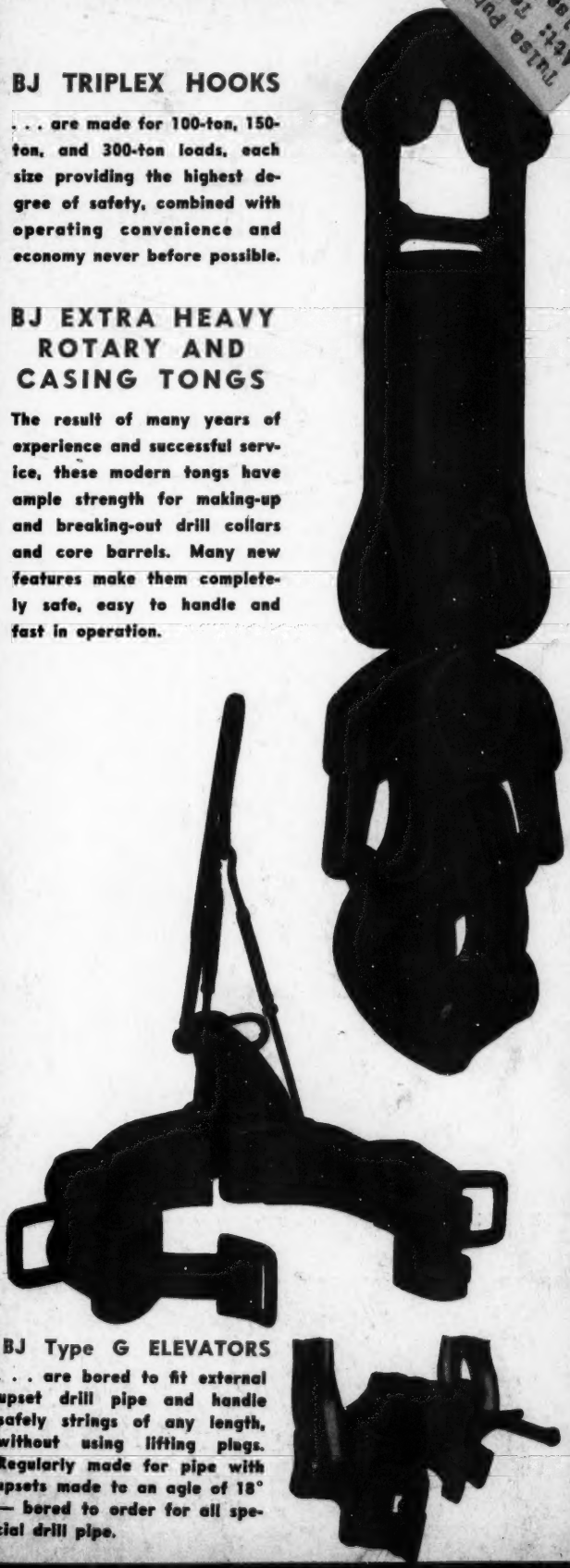

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THE AUTHORITY ON THE CALIFORNIA OIL INDUSTRY

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Bottom-Hole Pressure Studies Important

Guide to Proper Operation of Oil Wells

By C. V. Millikan*

Bottom-hole pressure measurements had their first application in the oil-field development in 1930, and their use was greatly expanded in 1931. Since then their measurement has become common practice in many fields. Most of the bottom-hole pressure work has been directed to the operation of the fields as a whole and to problems primarily of a technical nature. Less has been done with the object of solving current oil-well operating problems. It is in this direction that application of bottom-hole pressure measurements has greatest opportunity for expansion.

The application of pressures to operating problems is not new. In fact, it is as old as producing problems. Only the precise measurement of effective pressures is new. Tubing pressures and casing pressures of flowing wells have always been important factors in operating wells, and under restricted production their importance is increased. Changes in these pressures correlated with age or with rate of production, have been considered as giving important information as to the quality of the well, sand conditions, conditions of the bore hole through the sand, and whether the equipment in the hole is operating properly. The reasoning which leads to such interpretations is sound, but too often the pressures are misleading. Changes in fluid level, specific gravity of the fluid, or gas-oil ratio cause changes in surface pressures which may not represent changes at the bottom of the hole. As it is the difference between the pressure back in the sand and the pressure in the hole at the face of the sand that causes the well to produce, a change in this differential pressure results in a change in rate of production. When interpretations are based on pressure changes at the bottom of the hole where variations of fluid level, specific gravity, or gas-oil ratio have no effect, they are much more dependable.

A general study of bottom-hole pressures throughout an entire field has a direct application to the operation of a particular lease or an individual well. Bottom-hole pressure surveys of the field will provide data which will assist in making a more accurate estimate, much earlier in the life of the field, of the time when wells must be produced by artificial lift and of the amount of fluid that will have to be handled. It is of considerable value to know within reasonable limits when the wells will have to be pumped. It is useless to install pumping equipment years in advance of its requirement; but, on the other hand, it is not desirable to wait until the wells are dead. When bottom-hole pressure surveys indicate that the volume of fluid to be handled will be small, the type and size of equipment may be quite different from that selected when the quantity anticipated is large.

Flowing-Well Operations

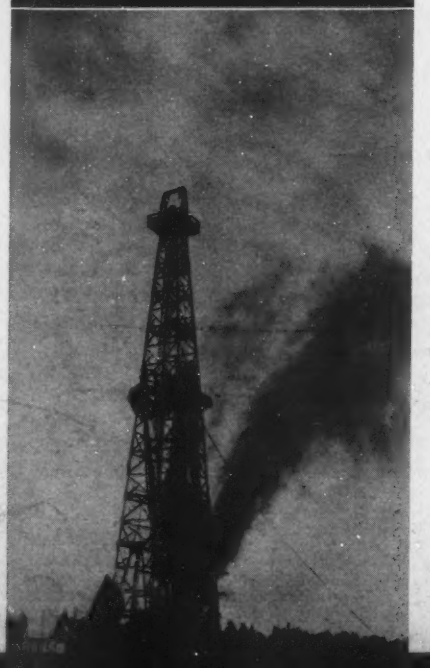
After a few wells in a field have produced at full capacity, a selected well can be produced at one or more lower rates, and the bottom-hole pressure measured. Curves can then be construed showing the correlation between the open-flow capacity, low rate of production, and the bottom-hole pressure, while producing at the low rate, and the reservoir pressure. These curves can then be used to determine the open-flow capacity of any other well in the same field using the bottom-hole pressure at some known low rate of production and the shut-in pressure. When conditions will not permit open-flow tests, an open-flow capacity estimated from a low rate of production and the bottom-pressure will be more reliable than estimates based on low-rate-production tests using surface pressures only.

A bottom-hole pressure flow test will give the productivity of the well which will be unaffected by friction through the flow pipe, chokes, surface connections, and equipment. A flow test is made by measuring the pressure decline from the static pressure at the face of the sand during a known rate of flow. Such a test will furnish information from which many characteristics of the reservoir and the individual well can be deduced. The data thus obtained make it possible to estimate the quality of the producing reservoir, to indicate changes in the sand close to the bore hole, and to indicate whether equipment in the hole—especially screen or liner—is effectively serving the purpose for which it was installed. Flow tests will also provide the best information on which to base an explanation of the cause of any change in well performance at a future time. The actual conditions in a well can be determined more quickly and more definitely with the aid of bottom-hole pressures than by production tests only.

When an oil sand is drilled with rotary tools, more or less water filters out of the mud into the porous sand. The presence of water in the face of the sand reduces the ability of the well to produce. The amount of water entering the sand and, therefore, the reduction in productivity are dependent on the sealing property of the particular mud, the length of time the mud remains against the sand, and the weight of the mud in excess of that necessary to counterbalance the pressure in the sand. When the well is produced, the infiltrated water will be gradually removed, and the permeability of the sand will return to normal. Under very low rates of flow this may require several weeks. Therefore, the first productivity test should not be made until the sand has been cleared of the water that may have filtered in from the mud during drilling.

A well which produces from several feet of good oil sand extending over considerable area would be called a good well. When such a well is opened or the choke is changed, the rate of production and the bottom-hole pressure will become stable in a short time. When the well is shut in, the bottom-hole pressure will build up to the maximum within a few hours. A well producing from a thin sand when opened will have a sharp decline in the bottom-hole pressure, followed by a slowed rate of decline—which will continue for several hours, or possibly days, before it becomes stable. The rate of production will also decline, but may not be as pronounced as the decline in bottom-hole pressure. When the well is shut in, the rate of build-up will be quite slow, especially after the first few hours. A well may have sufficient thickness of good oil sand to be a good producer, but its extent may be too small for large ultimate production. Such a well may have a good bottom-hole-flowing-pressure curve on a test of a few hours, but would weaken on a longer test. The closed-in static pressure decline would

* Amerada Petroleum Corp.



be high for the total amount of oil produced during a given period.

A reservoir rock should maintain its actual permeability throughout it producing life. An apparent change may occur due to change in viscosity of the oil, change in gas-oil ratio, or presence of water. Deposition of shales, paraffin, or possibly sediment filtered out of the moving oil and gas may cause partial blinding of the openings, and the permeability will decrease materially. If such conditions occur, they can be determined by comparing the productivity index soon after completion with that at the later date. When the change in productivity is more than can be accounted for by change in viscosity, gas-oil ratio, or water, a small shot, acid treatment or paraffin removal, and cleaning out may return the productivity to its original value. If the test shows no change in the productivity, cleaning out or other treatment cannot be expected to increase production.

The question of whether production from a flowing well can be increased arises frequently. In many cases it is believed that the production is flowing only from the top of a high fluid level. Such a condition is more likely to exist in a well that is producing through casing where the reservoir pressure and the gas-oil ratio are low. If the reservoir pressure is high and the bottom-hole pressure while flowing is low, there is little chance of increasing the rate of production by changing the method of production. It is much cheaper to test with a bottom-hole pressure gage than to change the method of producing which a test would have shown to be unnecessary. If the bottom-hole pressures indicate that a change in the method of producing is advisable, the same data will serve as a guide as to what change should be made.

Accumulation of water in the bottom of the hole is frequently the explanation given for rapid decline in production. Water may accumulate in the bottom of a well, produced at a low rate through casing in sufficient qualtity to build up enough pressure to retard production. Sufficient water to retard production is not likely to accumulate in a well producing through tubing, except when the rate of production is extremely low. Accumulation of water between the casing and tubing will not retard production. It cannot build up a pressure head higher than that at the bottom of the tubing. The pressure at the bottom of the tubing in any given well is dependent on the rate of flow, and such pressure must be balanced by pressure between the casing and tubing. This pressure may be due to gas, a column of oil, a column of water or, as is generally the case, a combination of these. When a detrimental accumulation of water is suspected to be present, its presence can be readily determined with a bottom-hole pressure gage. Pressures are measured at regular intervals of depth, for example, every hundred feet; and water, if present, will be determined by the higher pressure head for a given interval.

It is not uncommon for the hole through the producing formation to be filled with cavings sloughed from the walls. The rate of production may or may not be affected. The debris may be so loose that the resistance to flow is too small to be measured. If a flowing bottom-hole pressure measurement shows that the productivity has declined, the well needs cleaning out; but, if there is no change in the ability of the well to produce, cleaning out would be a useless expense.

Unconsolidated Sands

Production from unconsolidated sands present opportunities for bottom-hole pressure studies in many ways that are not of so much value in harder producing formations. Wells in such sands cannot always be produced safely at a rate high enough to obtain all the desired information. Perforated or slotted liners, screens, and perforated casing add further complications in determining cause of production difficulties.

In fields producing from unconsolidated sand it is dangerous to produce at too high a rate because of the possibility of bringing in sand which would cut the screen or liner, cut surface chokes or connections, or possibly sand up the well. The rate of production which will produce sand is dependent on the velocity of flow through the sand which, in turn, is dependent on the difference in pressure between the reservoir and the well. In some areas, especially the Gulf Coast, such danger is always present, and not often enough guarded against wisely. It has been more or less commonly accepted that any well can produce safely through a ¼-in. choke. Inasmuch as movement of sand is due to velocity of fluid through the sand, there is a maximum safe differential pressure to use in producing each well, which will have a relation to rate of production of a different well only when the permeability and thickness of the sand are the same. Therefore, it may be unsafe to produce from the thin sand of one well through a choke larger than ⅛-in.; while another

Failure to guard against well blowouts is an invitation to sudden disaster.

2. Blanks for Axelson collars, cut to proper length, are drilled to semi-finish bore size on turret lathes.

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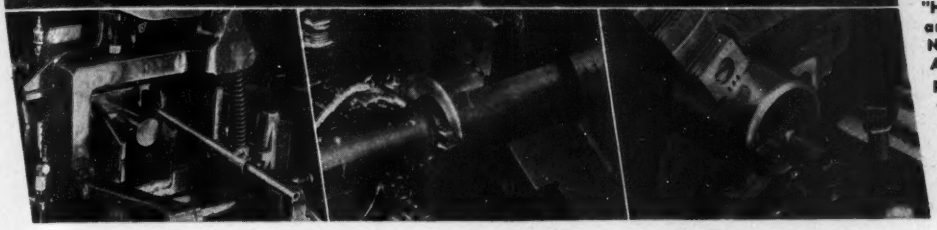

1. Blanks of cold rolled steel for Axelson pump collars are cut to length by automatic power hack saws.

3. After semi-finish boring, collars are then semi-finish counter-bored preparatory to finishing to size.

4. Collars are next counter-bored to finished diameter for jacket threads and checked for size.

There are some words that are never used in the Axelson factories. "Hurry" is one of them; "get-by" and "good enough" are others. Nothing is ever "good enough" in Axelson practice until it is the "best possible."

There is nothing better on earth than the solid cold rolled bar stock that Axelson uses for collars today. If there is anything better tomorrow, Axelson will have it. This is the policy that Axelson adopted forty-six years ago—it is the same policy that is still followed in Axelson plants today.

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5. The face of the collars which clamps against the ends of the liners is finished to a smooth, flat surface.

6. Axelson multiple thread circular chasers are used to produce jacket threads in one end of the collars.

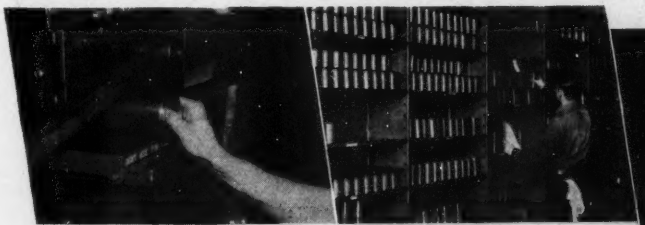
7. The operator gages each finished jacket thread for proper fit, after which inspector checks operator's gaging.

8. Collar is screwed on master chuck to be faced and radius machined on other end. Master chuck insures alignment of ends.

9. Next, tubing end is rough and finish bored. Axelson multiple thread circular chasers produce tubing threads.

10. Operator checks tubing threads after which the inspector verifies with plug gage that threads are correct.

11. Inspectors next give final check to other collar dimensions, i.e., length of threads, over-all length, etc.



12. Each collar is marked for identification with part number, size and other coding.

13. Axelson collars are stored in steel shelving after having been washed and coated with rust preventive solution.

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well, with thicker sand, may produce with safety through a ½-in. choke. A few carefully-conducted bottom-hole pressure flow tests in a field will establish, within reasonable limits, the differential flowing pressures that can be used safely.

The rate of production of a well may be reduced as a result of the screen or liner or perforated casing being partly clogged. The reaction of the bottom-hole pressure to changes in rate of flow when such a condition exists is characteristic. The pressure will drop rapidly to equilibrium when the well is opened. When shut in, the bottom-hole pressure will increase at nearly a constant rate until the maximum is reached. If the rate of flow is not affected by blinding of the liner, screen, or perforated casing, the pressure decline when opened up will be slower, and when shut in the rate of build-up will be fast at first but will become slower as the maximum is approached. The condition can be more readily recognized if flow tests have been made before the partial clogging or blinding has occurred.

Artificial-Lift Operations

Bottom-hole pressure determinations are of as much value in the current operation of wells producing by artificial lift as in wells flowing naturally. Here also pressure observations have always been an important part of the operating procedure; but the pressures, instead of being expressed in terms of pounds, have been expressed in terms of fluid level, rate of fill, or rate at which the fluid can be bailed down. Conclusions can be drawn from these observations, the same as for flowing wells, regarding the quality of the well, reservoir sand conditions, condition of the bore hole through the sand, what lifting equipment to install or, if installed, whether it is operating properly. Fluid-level measurements may be misleading because of the unknown and varying amount of gas in the fluid. When the fluid level and rate of fill are determined with a bottom-hole pressure gage, which is not affected by the gas pockets in the fluid, the same interpretations can be made but with greater confidence, because such pressures are measured at the face of the sand where pressure changes have a direct relation to rate of production.

When wells which will not flow naturally are being completed with cable tools, it is often valuable to make several production tests during drilling of the sand. A test ordinarily requires swabbing for several hours. Much swabbing time, with accompanying cost, can be eliminated by determining the rate of fluid build-up with a bottom-hole pressure gage. After the fluid is swabbed down, the gage is run in and allowed to remain for one or two hours. The amount of fill in barrels, as calculated from the increase in pressure, will be a reasonable gage of the well. Such gages are fairly reliable for rates up to 30 bbl. or 40 bbl. per hour, unless the sand is very loose and the reservoir pressure low.

Producing pressures can have a particularly important role in pumping wells. When a well stops flowing, the question arises as to how much it will produce on the pump. Pressure records during the flowing life can be a valuable aid in estimating how much oil can be pumped from the well. If the sand is tight and has an average or higher gas-oil ratio with good reservoir pressure, the well will probably make no more on the pump than it was producing at the time it stopped flowing. A well with a sand of high permeability, a lower than average gas-oil ratio, and a low bottom-hole pressure is likely to produce more than it was producing at the time it stopped flowing. Occasionally such a well is capable of producing sufficient fluid to justify installing gas-lift or some other means of lifting which is capable of handling more fluid than a beam pump. If static and flowing bottom-hole pressure tests which can be used to estimate the amount of oil are not available, it may be worthwhile to make tests such as described above for wells which are being completed with cable tools. A more positive test can be made by putting the well on the pump temporarily, with a recording pressure gage in the anchor. The short time required to make a test is cheap insurance against installing equipment which is not suitable to lift the production from the well.

It is often desirable to shoot or, in a lime reservoir, to treat with acid before putting on the pump—especially those wells which are put to pumping immediately after completion. Shooting or acid-treating lime, or both, are justified by the resulting increase in oil immediately available. A preliminary test of the well may show that it is already capable of producing a greater quantity of fluid than the pumping equipment can lift, and there would be nothing gained by an increase. An acceptable preliminary test may be run as described above for wells being completed with cable tools, but a better check would be a bottom-hole pressure pumping test.

When a well is put on the pump, it may not produce as much fluid as was expected—especially if good preliminary tests have not been made. A pumping test with a pressure gage in the anchor will prove whether the deficiency is in the ability of the well to produce the oil or in the ability of the equipment to handle the available oil. When a well is pumped with a recording pressure gage in the anchor, changes in fluid level while pumping will be shown by corresponding changes on the pressure chart. If the fluid level lowers almost to the working barrel, it may be accepted as conclusive proof that all the available fluid is being pumped. If the fluid level remains relatively high, more fluid is available. Generally, an acceptable estimate of the amount of additional available fluid can be calculated by assuming that the production will continue to increase in the same ratio as the lowering of the fluid level. In some fields—due to the depth of the wells, working fluid level, sand conditions, or very thick sand zones—the working barrel may be some distance above the normal point at which bottom-hole pressures are measured. In such wells, if the producing pressure is to be corrected to some lower point in the hole, the adjustment must be made on the average weight of the head of the gas-and-oil mixture, and not on oil head only as under static conditions.

General

The results obtained by bottom-hole measurements in the examples referred to have been those that might be expected under ideal conditions. It must not be assumed that actual tests can always be interpreted as clearly as the examples. There will be as many variations as there are tests. A knowledge of sand conditions, as interpreted from drilling, cores, and electrical logging, are valuable in interpretation of pressures. Casing and tubing pressures, misleading as they may be, will have some influence on interpretations. The structural position may have some influence, but in general it has not. The essential data for interpretation of bottom-hole pressures are the production record of the well and the history of bottom-hole pressures in that well and adjacent wells.

All oil produced is the result of pressure differences between the producing formation and the bottom of the hole. These pressures are basic, and any operating procedure depends on these pressures for its accomplishment. Therefore, bottom-hole pressure measurements have a definite and important part to play in the operation of oil wells.

●

The foregoing was prepared for presentation before The American Petroleum Institute.

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Cementing Liner in Three Stages

to Segregate Production in Wilmington Field

In the Long Beach Harbor District of the Wilmington field in California there are a number of wells that are drilled through three producing zones which required cementing between the three strata. In addition to the two cement jobs necessary for this purpose a third is often necessary within the limits of the middle producing zone itself. The cement not only protects the zones from water but also provides a means of separating the oil production, since that from the top formation (the Ranger) is always kept separate from the oil from the two Terminal zones below. Moreover, the production from the Upper Terminal and the Lower Terminal is sometimes segregated. The Baker equipment used for cementing operations in completing a typical well with the liner cemented in three stages is shown in the accompanying photograph.

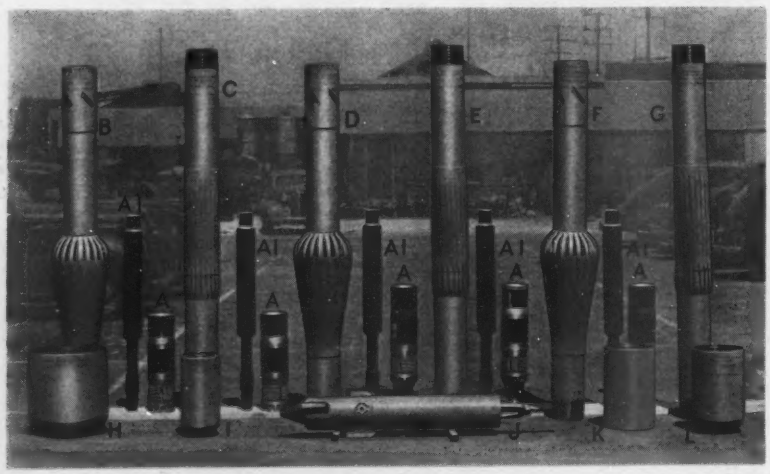
The 18⅝-inch Cement Guide Casing Shoe was used on the surface string. The water string set just above the Ranger sand at 2593 feet was equipped with the 11¾-inch Cement Guide Casing Shoe but the casing was floated in by means of the Cement Float Collar which was made up in the string above the shoe. The Wall Scraper was used to scrape the hole below the water string.

The 8⅝-inch liner which was hung in the 11¾-inch casing at 2540 feet was equipped with an 8⅝-inch cement bull plug casing shoe at 4252 feet and above this was a section of perforated liner through which oil from the Lower Terminal was taken. A blank section of pipe was located between the Upper and Lower Terminal zones and this was cemented by means of a No. 5-A Cement Retainer. In making up the liner, a 7-foot Whirler Baffle Collar (Solid with Metal "Petal" Basket) was placed at the bottom of the blank section of pipe and a Perforated Hook-up Nipple with Inverted Metal "Petal" Basket at the top. The Cement Retainer was set just above the ports of the Whirler Baffle Collar and cement pumped through the Retainer, out the ports and up around the blank section of pipe.

Another blank section of liner was located within the Upper Terminal to cement off a portion of this formation. At the bottom of this section was a Whirler Cementing Collar, Less Internal Mechanism, with Metal "Petal" Basket and at the top a Perforated Hook-Up Nipple with Inverted Metal "Petal" Basket.

A Cement Retainer was set as a casing bridge plug just below the ports of the Whirler Cementing Collar and a Cement Retainer then set just above these ports to cement the blank section of pipe.

A third blank section of liner located between the Upper Terminal and the Ranger zones was cemented with the same kind of equipment and the same procedure as the one immediately below. The complete cementing of the liner in three stages therefore required the use of five Cement Retainers and the other equipment as shown in the photograph. In completing the well for production a string of tubing was packed off at the top of the lowest blank section of liner and oil from the Lower Terminal was produced through this tubing. A flow string had been packed off at the bottom of the top blank section of liner and production from the entire Upper Terminal was brought in between the flow string and the tubing. Production from the Ranger was taken from between the liner and the flow string. The initial production from the two Terminal zones was approximately 3500 barrels per day and that from the Ranger 1200 barrels per day.



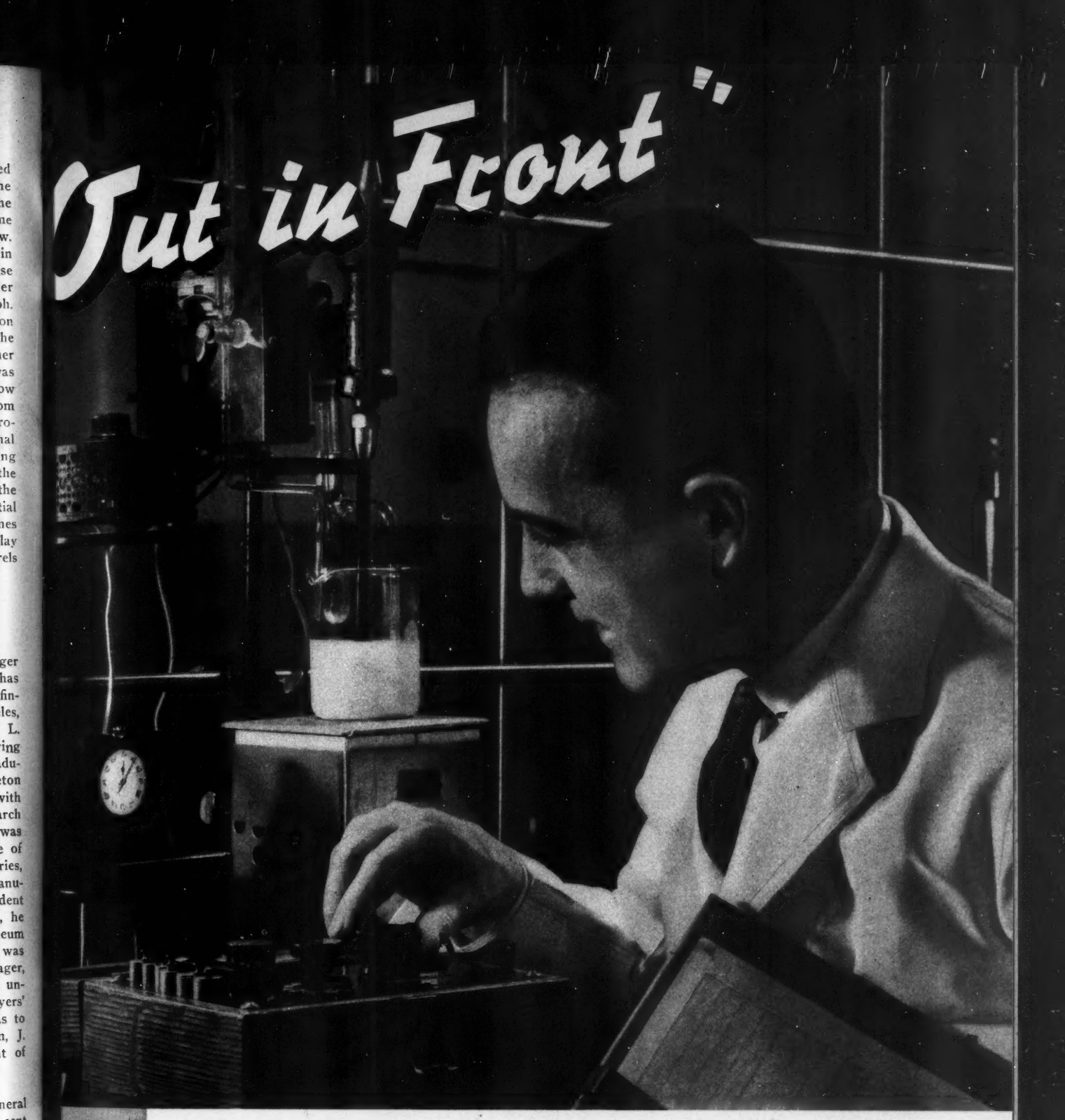
(A) Baker Cement Retainers; (A-1) Circulation Joints for use with Baker Cement Retainers; (B) Baker 7-Foot Whirler Baffle Collar, Solid, with Metal "Petal" Basket; (C) Baker Perforated Cement; (E) Hook-Up Nipple with (G) Inverted Metal "Petal" Basket; (D) Baker Whirler Cementing Collar, (F) less Internal Mechanism, with Metal "Petal" Basket; (H) Baker Regular Cement Guide Shoe; (I) Baker Regular Cement Bull Plug Shoe; (J) Baker Rotary Wall Scraper; (K) Baker Regular Cement Float Collar; (L) Baker Regular Cement Guide Shoe.

N. F. Myers Now Heads Union Oil Co. Refineries

Norval F. Myers, formerly manager of Union Oil Co.'s Oleum refinery, has just been appointed Manager of Refineries with headquarters in Los Angeles, according to a bulletin issued by L. G. Metcalf, director of manufacturing for the company. Mr. Myers, a graduate of Beloit College and Princeton University, first became associated with Union Oil Co. in 1925, as a research chemist at Wilmington, Calif. He was later appointed supervisor in charge of the control and analytical laboratories, and in 1932 was transferred to the Manufacturing Department as superintendent of distillation. In November, 1935, he became assistant manager of the Oleum refinery, and one month after was elevated to the position of manager, in which capacity he has continued until his latest promotion. Mr. Myers' first official act in his new post was to appoint as his successor at Oleum, J. N. Holden, formerly superintendent of maintenance at the refinery.

Although weekly earnings of general factory workers slumped off 11 per cent during the first three months of 1938, as compared with the same period last year, weekly earnings in the petroleum industry showed an increase of 6.8 in production and 8.2 per cent in refining, according to an analysis of the U. S. Bureau of Labor statistics by the American Petroleum Institute.

A total of 234 persons was convicted for evasion of gasoline taxes in the central states in 1937, as compared with 156 in 1936 and 134 in 1935.



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IL AND GAS WELL CHEMICAL SERVICE

Federal Agent Appears in Court

Hearing on Tideland Whipstocking Pact

What otherwise would have been a routine renewal of the compromise agreement between the state and the operators of whipstocked wells into Huntington Beach tideland was briefly enlivened by the first appearance of a Federal official claiming that the United States might have some interest in tideland oil production.

The official was Assistant U. S. Attorney Brett, who appeared before judge Turrentine in the Santa Ana Superior Court and asked the court not to approve the renewal of the agreement until the United States determines whether it has any interest in the oil pool lying offshore. The agreement is the one under which the operators have been producing the land for the past several years, and under which the state derives part of the royalties that go to make up its estimated $65,000 monthly oil royalty revenue.

That Judge Turrentine refused the request of the U. S. attorney is not nearly so significant as is the fact that the United States government is actually considering the possibility that it may own minerals lying off the shores of California. It is precisely this threat that has caused the formation of the United Landowners Association, Inc., which has been organized as a group to fight the Federal Government's claims, if any, as and when they are passed.

The entrance of the U. S. Attorney into the case was the first instance of its kind, as far as can be ascertained. That all operators in the area have been of the definite opinion that the pool was part of the public lands of the state, subject to title from the state, is generally known, and that this position has been attacked by the Congress in the last session, under the Nye resolution, has also been generally known.

There has been a feeling, however, that the Nye resolution, and the promise of similar action in the next session of Congress, were merely political fanfare, and that they would blow over. The attempted entrance of a representative of one of the Federal government's administrative departments into the Huntington Beach situation should effectively dampen such an idea, however, and should definitely indicate the seriousness of the condition facing California operators.

Up to a very short time ago, no one questioned the state's ownership of tidelands. On this unquestioned title, operators have drilled various tideland areas up and down the entire coast, and with the passage of the State Lands Act of 1938, opportunity for further development of tidelands, as well as other state-owned lands, was created.

The Federal government's claim, admittedly instigated by a group of individuals who hope to be the owner of tidelands because it then will issue oil and gas leases or permits to those individuals (at least, so they think), throws some doubt upon the possibility of development of these lands.

It certainly is logical to supose that if the government attempts to intervene at Huntington Beach, which has been producing oil for the past several years, on the grounds that it has an interest in the tidelands, it will also attempt to intervene in other tideland areas opened up for bids under the State Lands Act. In the event that such intervention is attempted, it may be allowed by another judge sitting in another court, and then the whole question will be thrown into litigation which some attorneys estimate will take up to 10 years to settle.

The effect of such litigation on the oil industry can easily be foreseen. The whole legal strength of the Federal government will be pitted against a few oil operators of the state, with the operators actually, through their taxes in part supporting the forces attacking them.

The whole question assumes proportions of the ridiculous, were it not for the many indications of its seriousness, when it is recalled that for periods of as long as 90 years, U. S. Supreme Court decisions have held that the states are owners of their tidelands and submerged lands up to the three mile limit. This ownership has been qualified, of course, as to certain U. S. rights to navigation control and supervision, and other such rights, but the actual ownership has been held to lie in the states.

Political action, questioning the validity of these decisions at least as to their application to mineral ownership, has already started. That it will be reopened when Congress again meets next January has been promised by none other than Representative Sam Hobbs, of Alabama, who as a member of the Judiciary Committee of the House, was one of the staunchest proponents of the Nye resolution, finally killed in the Rules Committee.

In its efforts to oppose any further action of the kind by the Federal government, the United Landowners Association, Inc., is seeking the cooperation and support of all industries who will be affected by a Federal claim to title of lands. The Association maintains that the problem is not one for the oil industry alone, but for all industries whose operations are in any way dependent upon natural resources, as well as such industries as title companies, banks, and financial institutions, whose operations depend to a greater or lesser degree upon the soundness and stability of land titles.

Schlumberger Sues Halliburton Cementing

Suit was filed Aug. 4, 1938, in the United States District Court for the Southern District of Texas, Houston Division, by the Schlumberger Well Surveying Corp. against the Halliburton Oil Well Cementing Co.

Schlumberger Well Surveying Corp. is charging infringements of certain of its United States patents.

The complaint asks for an injunction, for an accounting for profits, and for damages.

Gas Lift Corp. Control Goes to M. O. Johnston

M. O. Johnston has recently taken over a controlling interest in, and the management of, the Gas Lift Corp., Dallas, Texas, manufacturers and distributors of Bryan Flow Valves, Bryan Drop Valves, and Bryan Bottom-Hole Gas Lift Pump. It is contemplated that the headquarters of the corporation will be moved to Houston, Texas, in the very near future. There will be no change in the active personnel of the Gas Lift Corp.

New Oilwell Store

Another link has been added in the chain of "Oilwell" Sales and Service facilities—at Harbor City—where a new branch store has been established at the corner of Lomita Boulevard and Normandie Avenue, to meet the needs in the Torrance-Lomita area.

Nearly 20 per cent of the families with incomes of $15 a week or less living in middle-sized cities in the Rocky Mountain states own and operate automobiles, according to a survey made by the U. S. Bureau of Labor Statistics.

There are more than 250,000 producing oil wells in 22 states, drawing forth petroleum to supply gasoline and lubricating oil to keep the 30,000,000 motor vehicles moving on the roads of the United States.

Perkins Fibrous Rubber Top Plug.

Perkins Bottom Plug made of "Securaloy"

Perkins Wooden Top Plug.

TAKE YOUR CHOICE!

Perkins Top Plug made of "Securaloy".

rkins Wooden Bottom Plug.

Perkins Reversible Wooden Bottom Plug.

Perkins Reversible Fibrous Rubber Bottom Plug.

PERKINS SUPPLIES ANY TYPE OF CEMENTING PLUG YOU MAY PREFER

Perkins furnishes Wood, Fibrous Rubber or Metal plugs in connection with casing cementing operations. Thus the operator has a wide choice and can choose the plug best adapted to his particular requirements.

The Wood plugs are made of the best materials obtainable and consist of straight grained, air-cured heart stock for which Perkins pays a premium to insure the best results.

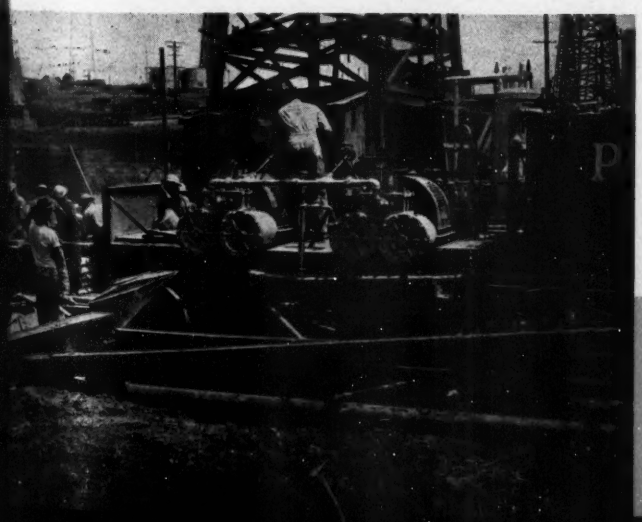
Perkins Fibrous Rubber plugs are unit constructed and will stand higher pressures without leaking by. Perkins pioneered the use of this type of plug.

Perkins Metal plugs are made of "Securaloy" and are the latest developments in cementing plug design.

Perkins has perfected and applied for patent on a Fool-Proof, Reversible Bottom Cementing Plug so that the plug cannot be placed in the casing upside down. This plug is available in Wood, Fibrous Rubber or Metal types.

In plugs, as in all other equipment necessary to the best in cementing, Perkins leads the way. Be sure it's Perkins—and be safe!

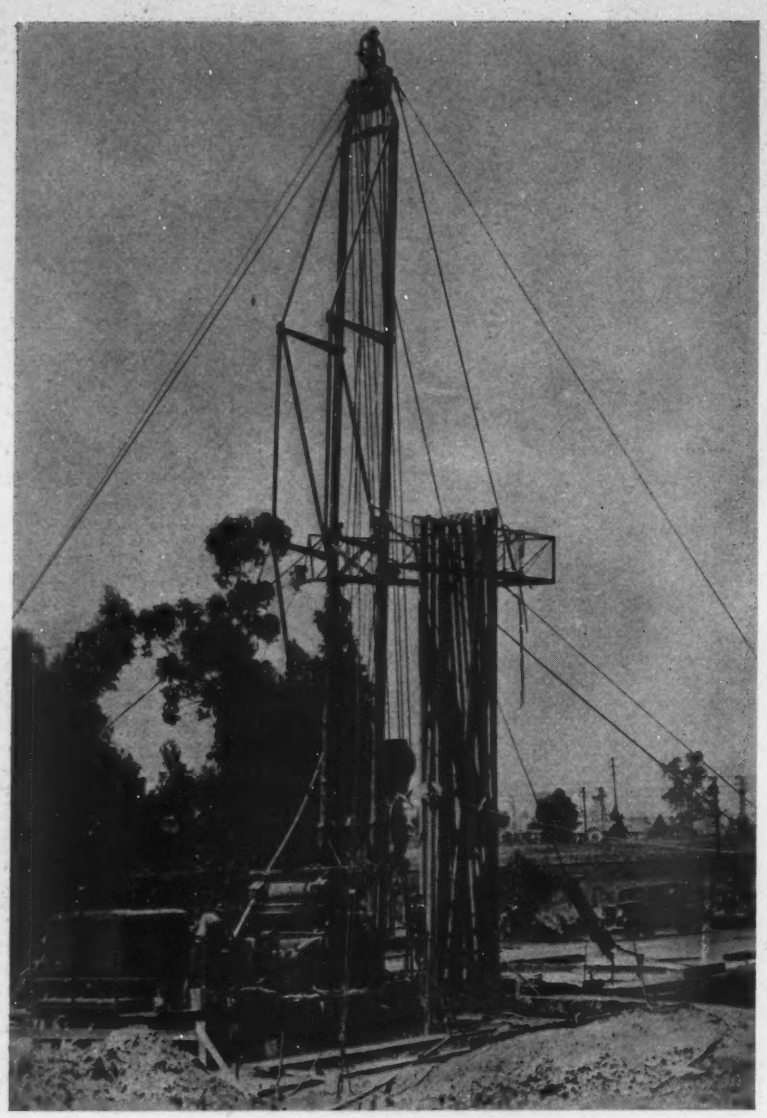
ty-eight years of experience are back of every Perkins Cementing job done today.



PERKINS *Cementing* INC.

342 PETROLEUM SECURITIES BLDG., LOS ANGELES

***FIELD OFFICES:* AVENAL, BAKERSFIELD, NORWALK, SANTA MARIA, TAFT, VENTURA**



Outstanding in performance has proved the new heavy duty type portable drilling rig used by Wilshire Oil Co. in drilling a deep water well near the company's refinery at Norwalk. The new rig, known as the Wilson Double Drum Portable Rotary Drilling Rig, is built for deep coring and heavy duty to a depth of 5000 feet, and drills a 7⅝-in. hole to that depth. Wilshire set 350 feet of 16-in. surface pipe in a 20-in. hole, then drilled on to the water sand, making 15-in. hole to set 10¾-in. casing. The rig easily handled the 30-ft. lengths of 5-in. drill pipe. The rig is said to be as easily operated and as efficient in core drilling operations.

Community Lease Form

The owners of townlots and other properties that are too small to warrant individual oil leases, and of acreage properties in wildcat areas which can best be tested under community leases, wherein the landowners all agree to pool their lands and divide among them any royalties and rentals accruing, will be glad to learn that a new form of lease has been devised which is said to have the effect of freeing the title of the individual parcels of land from any claims of the owners of other parcels. To the operating companies this will also be welcome news, as the fear of title snarls has already created the greatest sales resistance in signing up community leases.

This development has been brought about by the issuance of W. Nelson Shell's Community Form No. 1, published by the Oil Publications Co., Los Angeles. The title-clarifying clause of this lease was worked out in conjunction with the legal department of a leading title company and has the approval of some of the most prominent oil attorneys in the state.

Petroleum Equipment Handling Bethlehem

An announcement of considerable importance to the western oil industry was made this month by the Bethlehem Steel Corp. in the appointment of Petroleum Equipment Co. as California distributors for the Bethlehem Seamless Oil Country Tubular Goods.

Petroleum Equipment Co. whose main office is at 2800 S. Alameda St., Los Angeles, was organized in 1922 and today represents many of the foremost national manufacturers of oil country goods. Service and products are available at their main office in Los Angeles and at the field stores at Taft, Bakersfield, Long Beach, Kettleman Hills, Santa Fe Springs, Wilmington, Santa Maria and Fillmore.

The two principal operating heads of the Petroleum Equipment Co. are George Schweinhard, president and Roy Somers, vice president.

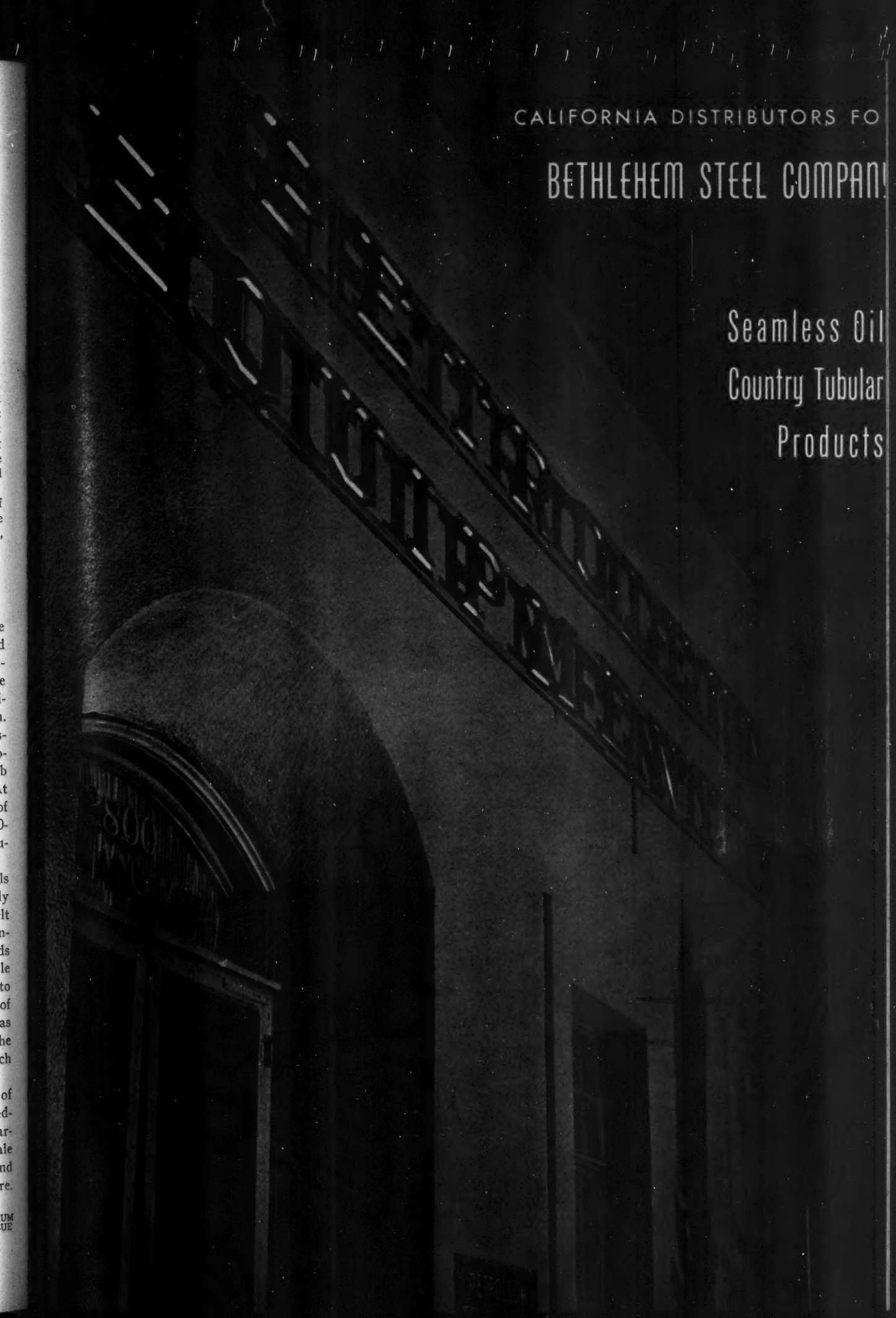
C. N. G. A. Views Giant Airplane

A visit through the plant of the Douglas Aircraft Co. plant guided by John C. Buckwalter, project engineer of the company, featured the Summer Beach meeting of the California Natural Gasoline Association.

More than 175 members of the association were present at the association dinner at the Deauville Club which preceded the plant tour. At the dinner Mr. Buckwalter spoke of the giant Douglas DC-4, 65,000-pound airplane which cost the manufacturers $1,750,000 to build.

The Douglas Aircraft Co. officials arranged the tour for the unusually large aggregation because they felt that cooperation of the petroleum industry is one of the essential needs of the aircraft industry. To enable the members of the association to view more closely the workings of their great organization, the Douglas Aircraft Co. officials divided the party into groups of 15, taking each group through the plant.

The most important meeting of the association on the August schedule is the Taft Chapter annual Barbecue to be held at the Stockdale Country Club, Aug. 26. Golf and other entertainment are on the fare.


CALIFORNIA DISTRIBUTORS FO
BETHLEHEM STEEL COMPAN
Seamless Oil
Country Tubular
Products

LAUGH THIS OFF

Word comes from Ballycastle, in the south of Ireland, that **Tom Taggart** has been seen darting hither and yon, sometimes in a nine horsepower Riley autocar, and sometimes in a one horsepower Irish jaunting car. Tom is over on the Ould Sod enjoying a vacation, and from all accounts the natives are shaking him down plenty on the local golf courses. It is reported that while he was driving off the first tee on the Ballycastle links recently, a daring rabbit strayed off the fairway and got hit with the ball.

And speaking of golf, we happened across the **Almquist** brothers, **Gil** and **Carl,** out on Griffiith Park a few days ago. Gil sure handles a mean iron. With a number two he can pick the ball off a good fairway lie, and send the ball skirling out into the distance at least 40 yards in a northeasterly direction. Carl, on the other hand, made some of the best drives we have even seen executed on a putting green.

Now comes **Bill Johnston,** the electrical wizard, telling the story of a pupil in the vocational school who described an armature as "a guy who sings on Major Bowes' program."

Reminding us to teli you that the lad who rides to and from work on the interurban railway is not a commutator.

One of **Red Wilson's** gaugers complained that his feet had fallen asleep, and Red right pronto remarked, "Yeah, I noticed when you were walking by a while ago that they had turned in."

And now that **Norval Myers** has come back to Los Angeles, we suggest that **Cy Rubel** enlist him in the old man's orchestra. Norval swings a hot saxophone. In fact, we understand that he has learned to play it with one hand, so as to keep the other one free for defense.

Bill Ackerman, our especially reliable correspondent from San Francisco, next jumps in to remark that all bald men are good natured. Nothing ever seems to get in their hair.

"What were you doing outside the Biltmore last night?" asked **Bill Robinson,** and **Bob Crippen** replied, "Why, I live there." "What, at the Biltmore!" says Bill. "No," says Bob, "Outside the Biltmore."

And **Frank Johns** declares it is equally foolish to buy tips from the touts at the track. Go to your garage mechanic if you want to know the names of the best plugs.

Frank, by the way, is another of the oil industry's most powerful divot lofters, but complains that the improvement in business is playing havoc with his game. Although he isn't Scotch, we understand that he carries a vacuum cleaner in his golf bag for getting the ball out of gopher holes.

After fancying Max Schmelling to the extent of five dollars to beat Joe Louis, the rousty repaired to a speakeasy. Presently his buddy dropped in and remarked breezily, "Drowning your sorrows, Bill?" "No," replied Bill, "I ain't exactly drownin' them, but I'm sure givin' them a darned good swimmin' lesson."

And **Hal Hirshon,** the U.C.L.A. football star who has been an oil man all summer, expresses his profound belief that a big apple a day will keep the doctor away.

The big apple being that old time dance that was started by Eve in the Garden of Eden.

On the other hand, it is simply foolish for these telephone operators to go out to the races expecting to make money. They are almost certain to choose the wrong plug.

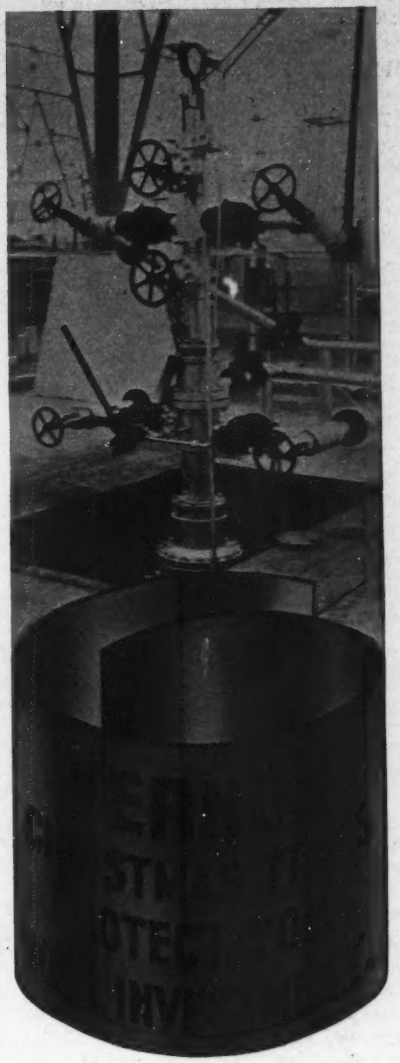
Which just goes to show how careful you have to be when you are talking to some people. Perhaps you have heard of the drilling superintendent who was working down in Wilmington during that very hot spell. When he became so thirsty in the afternoon that he couldn't stand it any longer, he sent a rousty over to the store for a bottle of Coca-Cola. "And get something for yourself," he added in a fit of generosity. So the rousty bought the coke for his boss, and a pair of shoes for himself.

HERE'S WHAT
I CAN DO
FOR
YOU
Use me to—BRING IN WELLS EASILY—GET GOOD CEMENT JOB — SET LARGER CASING OR LINER — STRAIGHTEN CROOKED HOLE—GET BOTTOM WATER SHUT-OFF—ENLARGE HOLE FOR GRAVEL PACKING—DETAILS ARE IN THE BAKER SECTION OF YOUR COMPOSITE CATALOG.
BAKER ROTARY WALL SCRAPER

State Drilling Report

Field	Company	Well	No.	Sec.	Twp.	Range
		NEW WELLS				
Coyote Hills	Richfield Cons. Oil Co.		2	22	3S	9W
	Standard Oil Co.	Bastanchury Ranch	3	18	3S	10W
San Luis Obispo Co.	G. E. Renner	R. H. L.	1	7	32S	22E
Lost Hills	California Lands, Inc.	Occidental	1	24	26S	20E
Mt. Poso	Ring Oil Co., Ltd.	Bowles 29	7	29	26S	28E
	Ring Oil Co., Ltd.	Rodgers-Jones	3	29	26S	28E
Kern River	California Star Oil Co.		5-80	22	28S	27E
	Helm and Smith	Helm and Smith	6-A	34	28S	28E
Fruitvale	Pacific Oil & Gas Dev. Corp.	Giusti	3	14	29S	27E
	Western Gulf Oil Co.	38-KCL-B		14	29S	27E
Round Mountain	Honolulu Oil Corp.		49	20	28S	29E
	Brown-Saffold Drilling Co.	Newberry	1	32	28S	29E
Tehama Co.	E. F. Stella, Trustee	Bryan	1	33	23N	3W
Kettleman N. Dome	K. N. D. A.		36	16	22S	18E
Long Beach	Hilldon Oil Co.	Pool	4	13	4S	13W
	Apex Petroleum Corp.		10	19	4S	12W
Rosecrans	The Superior Oil Co.	Maxwell Comm.	10	20	3S	13W
	Universal Cons. Oil Co.	Universal-Trust	5	18	3S	13W
	Union Oil Co.	Rosecrans	25	19	3S	13W
	Consolidated Petroleum Co.	Torrance	3	23	4S	14W
	Bankline Oil Co.	Kirby	1	20	3S	13W
Wilmington	O'Kane & Brain, Inc.	L.B.H.D.	O-3	2	5S	13W
	The Superior Oil Co.	Seaside School	1 & 2	2	5S	13W
	General Petroleum Corp.	Harbor Comm.	47 & 48	2	5S	13W
	General Petroleum Corp.	S. P.	17	2	5S	13W
	Richfield Oil Corp.	LBHD-G	1	35	4S	13W
	Universal Cons. Oil Co.	Newport	6, 7, 8 & 9	2	5S	13W
Montebello	Montebello Wesco, Inc.	Montebello	1	2	2S	12W
	Herley and Kelley	Masser	1	2	2S	12W
	The St. Helens Pet. Co., Ltd.	Monterey	29	2	2S	12W
Torrance	Fiat Oil Co.		1	23	4S	14W
	Elexico Oil Corp.	Elexico-Airey	3	22	4S	14W
	Packard Petroleum Corp.	Lomita	4 & 6	23	4S	14W
	Oil Development Corp.	S. R. Dunphy	1	23	4S	14W
	Packard Petroleum Corp.	Lomita	5	22	4S	14W
	Pennsylvania Oil Co.	Lomita	1	23	4S	14W
	California Star Oil Co.	Lermens	1	25	4S	14W
	California Star Oil Co.	O'Brien	1	25	4S	14W
	Morton & Elder	[illegible]titzer	1	22	4S	14W
	Kovell Oil Co.	Kovell	2	23	4S	14W
	MacDonald and Burns	Moore	10	22	4S	14W
	Blue Bell Petroleum Co.		1	23	4S	14W
	Star Pet. Co. of Calif., Ltd.	Patton	1	23	4S	14W
	Evangeline Kroh Ter Heun	Phelps-Kroh	1	23	4S	14W
Imperial Co.	Max Cawthon	Max Cawthon	2	14	11S	13E
Midway	Big Ten Oil Co.		12	36	32S	23E
Rio Bravo	The Superior Oil Co.	Ruhl	2	1	29S	25E
Ten Section	Shell Oil Co.	KCL-B	72-31	31	30S	26E
Canal	Shell Oil Co.	Canal-A	45-14	14	30S	25E
Coalinga	Standard Oil Co.		82	13	20S	15E
		DEEPEN OR REDRILL				
Torrance	Lomita Drilling Co.	Hogan	1	22	4S	14W
	M & M Oil Co.	M & M	1	23	4S	14W
	C. C. M. O. Co.	Torrance	18	14	4S	14W
	California Star Oil Co.		1	23	4S	14W
	Kenber Oil Co.	Empire	2	14	4S	14W
	Hansco Oil	Gladys	1	14	4S	14W
Wilmington	Richfield Oil Corp.	Pacific Dock	7	3	5S	13W
	Walter Hughes	Hughes	1	33	4S	13W
	So. Calif. Pet. Corp.		W-1	33	4S	13W
	R. T. Colter & W. G. McAdoo	Colter	1	32	4S	13W
Santa Paula	Wheeler Canyon Oil Co.	Henderson Union	16	25	4N	22W
Bardsdale	Clarence B. Douglas	Calumet	B-1	3	3N	19W
Mesa	Trans-Oceanic Oil Corp.	Morrison	1	28	4N	27W
	Anacapa Oil Corp.	Low	5	28	4N	27W
Santa Maria Valley	Union Oil Co.	Wheat	2	22	10N	34W
Elwood	Bransdall Oil Co.	Luton-Bell	19	15	4N	29W
Midway	Western Mesa Oil Corp.		17	14	31S	22E
Elk Hills	Standard Oil Co.	Kern Co. Lease No. 1	12	31	30S	25E
Kern River	Walter J. Cordes		28-A	32	28S	28E
	Marr & Janeway	Newhouse	5	11	28S	27E
Fruitvale	W. F. Higgins	Haberfelde	1	21	29S	27E
Montebello	The Texas Co.	Baldwin	17	6	2S	11W
Huntington Beach	J. W. Weaver	Brockman	1	10	6S	11W
Long Beach	The Texas Co.	Goddard	1	29	4S	12W
Dominguez	W. W. Stabler	Dominguez	3	3	4S	13W
Edison	Fred Siemon	Metro	2	6	30S	29E
Fruitvale	H. L. J. Oil Co.	H. L. J.	1	23	29S	27E
Mountain View	Gilmore-Snyder Co.	Mullaney	3	24	30S	28E
Tracy Gas	Amerada Petroleum Corp.		31-22	22	2S	5E
Kettleman N. Dome	The Superior Oil Co.	Huffman	4	29	21S	17E
	Standard Oil Co.		54	19	21S	17E
Playa Del Rey	Treasure Co.		1	21	2S	15W
Long Beach	Bremil Petroleum Corp.		4	24	4S	13W
		ABANDON				
Long Beach	Exeter Oil Co., Ltd.	Stevens	1	13	4S	13W
	Indiana Drilling Co.	Rainbow	1	24	4S	13W
Playa Del Rey	A. T. Jergins, Trust	Black Gold	1	21	2S	15W
Long Beach	Rotary Drillers, Inc.	Hinshaw	1	29	4S	12W
El Segundo	Richfield Oil Corp.	El Segundo	6	18	3S	14W
Richfield	Shell Oil Co.	Swain	1	28	3S	9W
Newhall	Peerless Laundry Co., Ltd.		1	12	3N	16W
Ventura Co.	Darby Oil Co. of Nevada	Darby	1	7	2N	19W
Kern Co.	C. C. White	White-Harp	1	9	26S	26E
	Amerada Petroleum Corp.	Olcese	1	4	29S	29E
	The Texas Co.	Pioneer Unit Plan	1	33	11N	23W
	General Petroleum Corp.	Arvin	1	26	31S	29E
Mountain View	Buffalo Oil Co.	Buffalo	2	19	30S	29E
Round Mountain	Ring Oil Co., Ltd.	L & S	1	11	28S	28E
Coalinga	Standard Oil Co.	7, 15, 17, 21, 23 & 25	20	19S		15E
Elwood	Southerude Oil Co.		191-2	25	4N	29W
Midway	North American Oil Cons.		8 & 35	30	31S	24E
	North American Oil Cons.		2	32	31S	24E
	Tide Water Associated Oil Co.		71 & 101	2	31S	22E
	Standard Oil Co.		18	19	31S	24E

Summary	Week Ending August 13	Previous Week	To Date This Year	To Date Last Year
Total New Wells	34	22	752	989
Total Deepened or Redrilled	16	17	511	427
Total Abandoned	9	18	299	323



VERNON Christmas Trees are on some of the deepest California Wells.

We can meet your requirements for *any* conditions—testing up to 10,000 pounds.

All VERNON Fittings—Crosses, Tees and Nipples, are forged and heat-treated.

VERNON TOOL CO., LTD.
2740 EAST 37TH STREET, LOS ANGELES, CALIF

Natural Gasoline Plants Larger

and Fewer, Federal Survey Shows

By G. R. Hopkins[1] and E. M. Seeley[2]

The concentration of the natural-gasoline capacity in fewer hands and fewer units, which first became evident about 1929, was continued in 1936 and 1937. This was indicated by the sixth biennial survey of natural-gasoline plants as of January 1, 1938. This survey indicated a total of 741 plants as of that date compared with 793 on January 1, 1936, and 1,155 on January 1, 1928. Of the 741 plants on January 1, 1938, 679 were operating and only 62 were closed down. The dismantling of at least 50 relatively small plants in Oklahoma and Illinois was largely responsible for the decline in number of plants in 1936 and 1937. Texas and New Mexico were virtually the only States in which the number of plants increased during the 2-year period.

Despite the material decline in number of plants, the total capacity on January 1, 1938, was not much more than it was on January 1, 1929. This was because nearly all of the new plants were large, whereas most of the plants torn down were small. Another consideration was the enlargement of plants by the addition of new units. The total capacity of all the plants on January 1, 1938, was 11,083,000 gallons daily, of which all but 351,000 gallons (3 per cent) was at operating plants. However, the operating plants ran at not quite 60 per cent of capacity in 1937. Texas had about a third of the operating capacity on January 1, 1938, California about 30 per cent, and Oklahoma slightly more than 20 per cent. About half of the gain in daily operating capacitiy in 1936 and 1937 of 1,689,000 gallons was credited to Texas. Furthermore, nearly half of the increase in Texas was in the two leading districts, Panhandle and East Texas. It was expected that the eliminatioin of "stripping" in the Panhandle would reduce the total capacity, but actually the total capacity increased from about 1,300,000 gallons daily on January 1, 1936, to about 1,450,000 gallons daily on January 1, 1938. The capacity in the East Texas field increased from about 425,000 gallons daily on January 1, 1936, to about 615,000 on January 1, 1938. This gain resulted primarily from a gain in number of producing oil wells from 19,520 on January 1, 1936, to about 25,000 on January 1, 1938, although competition of gasoline manufacturers for casinghead gas from the older wells was probably also a factor.

Although the number of absorption plants continued to decline, the total capacity increased materially in 1936 and 1937. Plants using the compression process, the other major type, declined both in number and total capacity. The charcoal process, supposedly too expensive to operate at the relatively low prices of recent years, maintained its relative position in 1936 and 1937; in fact, a small rise in capacitiy was reported.

Capt. A. E. Higgins

Capt. A. E. Higgins, vice president of the Pittsburgh Equitable Meter and Merco-Nordstrom Valve Cos., is in Los Angeles inspecting the new sales offices and warehouse recently completed by his company, and is studying the possible need for further expansion to serve the West Coast Oil and Gas Industries. Captain Higgins, who flew from Pittsburgh in his four-passenger Stinson cabin plane, will remain in Los Angeles to attend the Pacific Gas Association annual convention at Santa Barbara.

"Reprinted from Bureau of Mines Information Circular 7031."

[1]Assistant chief economist, Petroleum Division, Bureau of Mines.

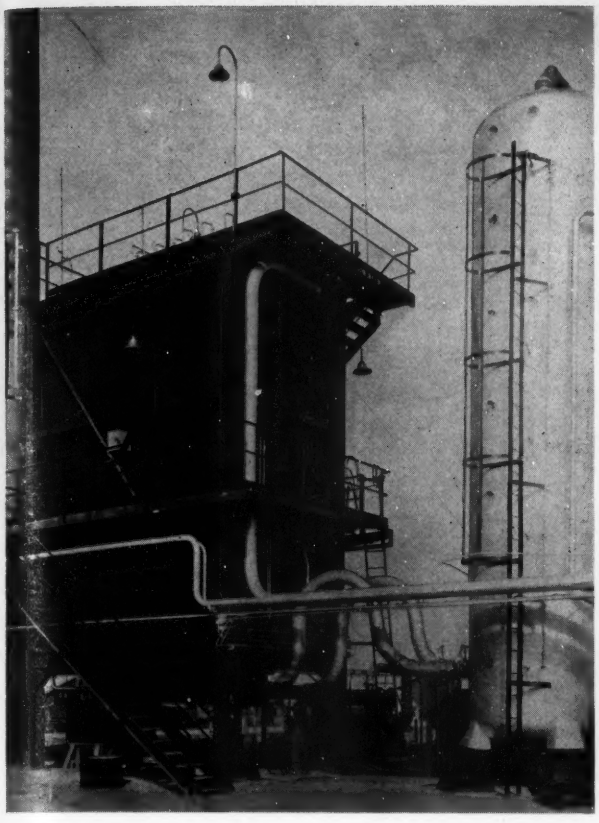
[2]Statistical clerk, Petroleum Economics Division, Bureau of Mines.

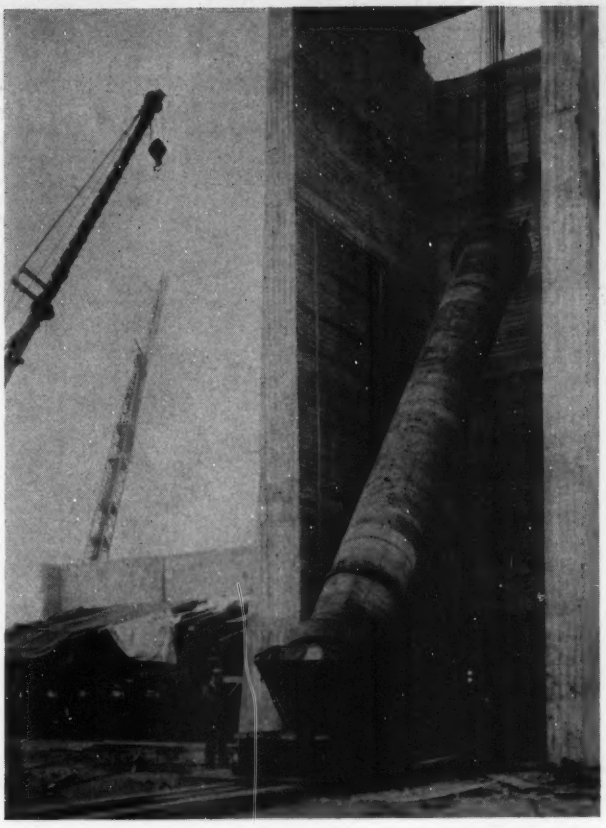
RECAPITULATION BY STATES

January 1, 1938

	Number of Plants							Capacity per Day, Thousands of Gallons						
	Operating	Shut Down	Total	Absorption	Compression	Combination	Charcoal	Operating	Shut Down	Total	Absorption	Compression	Combination	Charcoal
Arkansas	8	1	9	5	.....	4	.....	117	2	119	65	.....	54	.....
California †	93	15	108	105	3	.....	.....	3,240	197	3,437	3,395	42	.....	.....
Colorado	2	.....	2	1	1	.....	.....	6	.....	6	6	‡	.....	.....
Illinois	48	1	49	.....	49	.....	.....	18	‡	18	.....	18	.....	.....
Kansas	19	2	21	17	4	.....	.....	316	20	336	320	16	.....	.....
Kentucky	8	.....	8	3	4	.....	1	45	.....	45	42	‡	.....	3
Louisiana	28	1	29	24	3	2	.....	420	3	423	298	11	14	.....
Michigan	1	.....	1	.....	1	.....	.....	12	.....	12	.....	12	.....	.....
Montana	1	.....	1	1	.....	.....	.....	16	.....	16	16	.....	.....	.....
New Mexico	5	.....	5	5	.....	.....	.....	150	.....	150	150	.....	.....	.....
New York	1	1	2	1	1	.....	.....	‡	‡	‡	‡	‡	.....	.....
Ohio	11	1	12	6	5	.....	1	49	‡	49	42	1	.....	6
Oklahoma	133	8	141	99	32	10	.....	2,343	16	2,359	1,981	228	150	.....
Pennsylvania	98	16	114	20	92	.....	2	108	34	142	106	30	.....	6
Texas	135	5	140	96	29	15	.....	3,471	27	3,498	2,653	513	332	.....
West Virginia	82	10	92	28	57	.....	7	325	47	372	226	70	.....	76
Wyoming	6	1	7	5	2	.....	.....	96	5	101	30	71	.....	.....
TOTAL	679	62	741	416	383	31	11	10,732	351	11,083	9,430	1,012	550	91
January 1, 1936	694	99	793	430	333	18	12	9,043	620	9,663	8,064	1,244	276	78
January 1, 1934	741	128	869	441	373	39	16	9,181	879	10,060	8,563	973	429	95
January 1, 1932	859	100	959	476	398	68	17	10,657	730	11,387	9,135	1,185	945	122
January 1, 1930	999	36	1,035	486	411	115	23	10,278	238	10,516	7,956	1,063	1,311	186
January 1, 1928	1,060	95	1,155	526	497	104	27	7,754	294	8,048	5,476	1,398	960	214

†—Data compiled by E. T. Knudsen, San Francisco office, Bureau of Mines.
‡—500 gallons or less.





At left, this generation unit converts natural gas into hydrogen gas. Catalysts in tubes in the furnace and in the white tower at the right convert the natural gas and steam into crude hydrogen. At the right, is the reaction oven being raised into place. Here the purified hydrogen gas is combined with the raw material from the polymer plant for synthetic gasoline.

Hydrogenation for Premium Motor Fuel

and Specialties at Standard Refinery

Early in 1928 many refiners in the United States were startled at a revelation from unimpeachable sources that a group among them were planning to install a revolutionary type of plant developed by I. G. Ferbenindustrie and Standard Oil Development Co., which would enable them to convert 100 barrels of crude oil into 105 barrels of gasoline of premium quality.

Refinery chemists, of course, had heard as early as 1913 that F. Bergius and J. Billwiller "hydrogenated" finely powdered coal at high temperatures and pressures almost wholly converting the coal into liquid products. It was pointed out at that time that while the liquid product of ordinary destructive distillation of coal was only 3 per cent, the amount of liquid products obtained by the Bergius method reached almost 100 per cent of the coal charge. It was claimed that the process was applicable not only to coal and other carbonization products, but also to wood, peat and other vegetable material and to the products of coal distillation, such as tar bottoms.

As late as 1921, however, no startling developments were anticipated in the attempts to hydrogenate petroleum oils on a commercially practical scale. Said Carleton Ellis and Joseph V. Meigs, outstanding consulting chemists, in 1921: "Since the day when Sabatier attracted the attention of chemists to the powerful hydrogen-carrying properties of catalytic nickel, there have been numerous suggestions directed to the hydrogenation of petroleum oils. Most of these have been offered without a full realization of the sensitiveness of catalytic nickel to various unfavorable conditions and particularly to the action of certain bodies which destroy catalytic activity. A considerable number of substances check catalysis of this kind, either wholly or in part. Arsenic, phosphorus and sulphur compounds often make their presence quickly evident. Such bodies, commonly termed catalyzer "poisons," have an important bearing on the hydrogenation of petroleum oils in which, for example, sulphur is a usual constituent."

Although Dr. Ellis was later to contribute voluminously to the studies which made hydrogenation of petroleum a commercial reality, the naturally conservative attitude of the scientist permitted him to say no more than the following in 1921:

"SUPERIOR TO ANY OTHERS WE HAVE EVER USED" *says F.C.Hall*

Four CLARK 400 H.P. "Super-2-Angle" Compressors, F. C. and E. P. Henderson Co. Gasoline Plant, Sanford, Texas.

F. C. Hall, General Manager of the F. C. and E. P. Henderson Company, of Amarillo, Texas, writes us, regarding the battery of CLARK "Angles" shown above, "Our records show these machines superior to any others we have ever used." These 400 H.P. "Angles" have been in service at the company's Sanford plant for the past year. Mr. Hall's letter continues:

"We believe a large amount of credit should be given to your new idea of oil-cooled pistons which has had a great deal to do with the steady operation and the absence of ring trouble and any appreciable power-cylinder wear.

"We were very much pleased to note the record speed in making the installation, and the low transportation, foundation and building costs as compared with horizontal machines. In closing I might also mention the value of the fully enclosed, dust-proof design in this West Texas country."

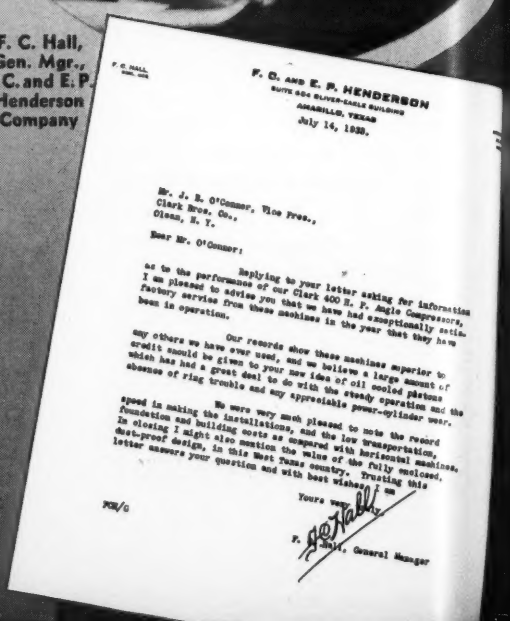
Mr. Hall's report is typical of what hundreds of users are saying about the CLARK "Angle." Let us send you our new catalog.

CLARK BROS. COMPANY . . . . . OLEAN, NEW YORK

Smith-Booth-Usher Co.
LOS ANGELES, CALIF. PACIFIC COAST DISTRIBUTORS

CLARK

F. C. Hall, Gen. Mgr., F. C. and E. P. Henderson Company



F. C. AND E. P. HENDERSON
SUITE 604 OLIVER-EAGLE BUILDING
AMARILLO, TEXAS

July 14, 1930.

Mr. J. E. O'Connor, Vice Pres.,
Clark Bros. Co.,
Olean, N. Y.

Dear Mr. O'Connor:

Replying to your letter asking for information as to the performance of our Clark 400 H. P. Angle Compressors, I am pleased to advise you that we have had exceptionally satisfactory service from these machines in the year that they have been in operation.

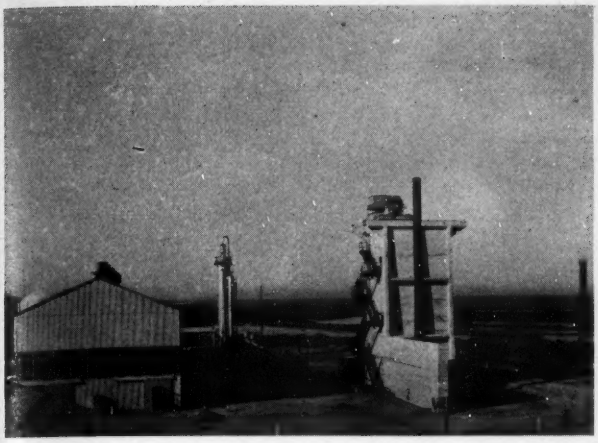
Our records show these machines superior to any others we have ever used, and we believe a large amount of credit should be given to your new idea of oil cooled pistons which has had a great deal to do with the steady operation and the absence of ring trouble and any appreciable power-cylinder wear.

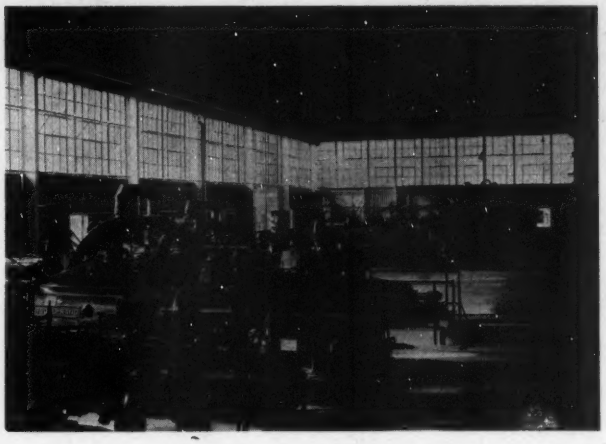
We were very much pleased to note the record speed in making the installations, and the low transportation, foundation and building costs as compared with horizontal machines. In closing I might also mention the value of the fully enclosed, dust-proof design, in this West Texas country. Trusting this letter answers your question and with best wishes, I am

Yours very truly,

F. C. Hall, General Manager

FCH/G





Left, this view of a part of the new plant shows, at left, one end of the building housing the control room and the battery of gas compressors, the gas purification system in the center, and, on the right, the firewall and the high concrete stall which surrounds the reaction aven. Right, is a view showing part of the compression system so essential to the hydrogenation process.

"There may be a future for the hydrogenation process in the treatment of cracked gasoline. In the refining of this product with sulphuric acid and alkali there is a shrinkage which although servative attitude of the strict scientist small in amount per barrel of gasoline so refined, yet constitutes a very substantial annual loss. In some investigations carried out by one of the authors (Ellis and Meigs) a sample of cracked gasoline of a high degree of unsaturation, possessing bad odor and brown color, was treated with hydrogen in the presence of a nickel catalyzer and afforded a well-saturated water white product of sweet odor and stable for an indefinite period. No gummy deposit formed even on keeping for several years, while the unhydrogenated sample deposited a heavy layer of gum on standing only a fortnight.

"The gases of a cracking plant contain large amounts of hydrogen and hence at a refinery cracking oil, the materials are available for hydrogenation. There is, therefore, a possibility that hydrogenation may some day find a place in the oil refinery."

It appeared, therefore, that while conversion of vegetable oils into more valuable and useful products by hydrogenation became a highly profitable business, the refiners of petroleum were not to realize their dream of producing nearly 100 per cent of superior gasoline from crude oil or even bottoms. If no catalyzer, or agent which would cause hydrogen to enter the hydrocarbon molecules' structures, thus reducing carbon to hydrogen ratio, could be found which would remain operative in the presence of traces of sulphur, then hydrogenation of petroleum on a large scale would never be practicable.

That was the view yesterday. Today, the story is entirely different. Today Standard Oil Co. of California is adding the finishing touches to its new Hydrogenation plant for the manufacture of synthetic aviation gasoline, built at a cost in excess of one million dollars and the first of its kind in the western part of the country. "It is no exaggeration to state," says a spokesman for the company, "that the plant and its product mark the successful culmination of over forty years of technical progress."

How the fading dream of producing gasoline of maximum anti-knock quality, stability and distillation characteristics from petroleum by hydrogenation became an outstanding reality is told as follows in the Standard Oil Bulletin:

Petroleum contains appreciable percentages of sulphur and for many years it seemed almost hopeless to expect that the hydrogenation treatment could be applied to petroleum refining. A few experimenters, undaunted by this obstacle, conceived the idea that by application of high pressures it might be possible to make hydrogen combine with petroleum even in the presence of sulphur. Acting on this hypothesis, catalysts immune to sulphur poisoning were finally developed and small-scale laboratory hydrogenation of petroleum was an accomplished fact.

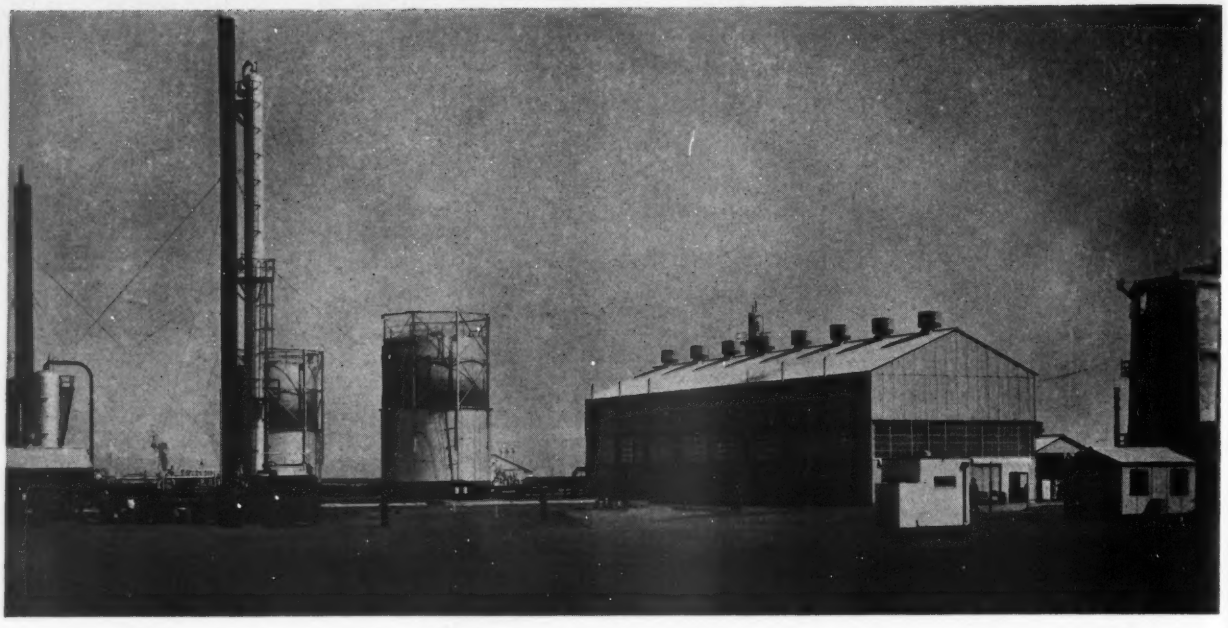
The translation of these laboratory findings into commercial equipment suitable for the handling of hydrogen gas under the high pressures required brought new problems, this time largely of an engineering rather than a chemical nature. Numerous ingenious designs were developed and vast sums of money were expended before the proper solutions of these problems were reached. In this connection, much credit is due the Hydro Engineering and Chemical Co., designer of the plant described here.

Several views of Richmond Refinery's new Hydro plant are shown in the accompanying photographs. Let us describe briefly the principal units shown and outline the function which each performs.

A logical starting point is the generation of the hydrogen gas. This is accomplished by contacting at high temperature a mixture of natural gas and steam with a catalyst. The product is a crude gas mixture containing both hydrogen and carbon monoxide. Before the hydrogen can be used the carbon monoxide must be removed. Additional steam is added, the mixture is passed through another catalyst which converts carbon monoxide to carbon dioxide, and the latter is finally removed by treatment with a chemical reagent known as monœthanolamine. An interesting feature of the carbon monoxide to carbon dioxide conversion is that one volume of hydrogen is produced for each volume of carbon monoxide eliminated, so that a two-fold purpose is served in this one unit.

The purified hydrogen is piped to three steam-driven compressors which deliver the gas at a pressure of 3500 pounds per square inch. A definite concept of the magnitude of such a pressure is best gained from a concrete example. Thus, if one imagines a cylinder containing a moveable piston of one square foot area, the force required on one side of the piston to compress gas on the other side of the above pressure would be approximately 200 tons.

The purified, compressed hydrogen is now ready for reaction with the raw material used in manufacturing synthetic gasoline. This raw material is the product of the company's new polymerization plant, which converts "fixed" gases from cracking operations into liquid product, as described in the May 20 issue of The California Oil World.



This is a general view of Standard Oil Co. of California's new hydrogenation plant which produces aviation motor fuels and such specialties as high ignition quality diesel fuels, high solvent power thinners, high quality lamp oils, and other premium products, from a by-product of the cracking process.

From the standpoint of the technical problems involved, doubtless the most interesting single piece of equipment in the new Hydro plant is the reaction oven in which the actual combination between hydrogen gas and gasoline polymers is accomplished. This vessel is a vertical steel cylinder, forty feet in length by three feet in inside diameter with walls several inches thick, presenting somewhat the appearance of a huge cannon. A specially built freight car was required for its transportation to the Richmond refinery. The hydrogenation catalyst contained in this cylinder is specifically adapted to the reaction of polymer hydrogenation. An interesting sidelight in this connection is that the catalyst is insensitive to the presence of sulphur.

The mixture of hydrogenated product and excess hydrogen gas is discharged from the reaction oven, still under pressure of about 3000 pounds per square inch, through a cooling and condensing system in which the gasoline vapors are liquefied. Following the separation of the gas and the liquid, the excess gas is recycled back to the oven, the pressure on the liquid product is released, and the latter passes to a stabilizer in which any remaining gaseous products are removed. The final product is synthetic gasoline, a highly refined fuel possessing the exceptional anti-knock characteristics desired for the most severe aviation service.

In addition to its specific utility in the manufacture of synthetic gasoline, Richmond refinery's new Hydro plant is designed with a flexibility which makes it readily adaptable to a number of other services. Among these may be mentioned the manufacture of high ignition quality diesel fuels, high solvent power thinners, and high qualitiy lamp oils. It may also be used in the manufacture of other products, for example, cracked naphthas, which are normally refined by methods other than hydrogenation.

Operated in conjunction with the commercial plant is a small high pressure pilot plant. One function of this unit is to determine the optimum conditions for operation of the commercial equipment; a second function is to study thoroughly the effects of operating variables on yields and qualities of products long before the proposed service is required of the commercial unit; a third, and possibly the most important function, is the critical investigation of the manufacture of the unique new or improved products suggested by laboratory research.

In accordance with the company's long established policy of providing for maximum safety for its employes, both commercial plant and the pilot plant are equipped with devices to eliminate every possible hazard. For example, automatic alarms give warning whenever the oxygen content of the hydrogen reaches 0.2 per cent, only one-tenth of the oxygen percentage required for an explosive mixture; a complete inert gas manufacturing system furnishes a noncombustible gas for removal of all explosive gas from the entire plant; safety relief valves are provided on all pressure equipment; control valves in the lines supplying hydrogen to the reaction oven are operated from behind a concrete fire wall; electric wiring is of the explosion-proof type; the entire oven is housed in a concrete fire-proof stall; and, in case of an emergency, the hydrogen and oil content of the whole hydrogenation system may be vented to the atmosphere through a release stack equipped with an automatic water spray.

J. N. Holden Appointed Union Oleum Plant Head

In a bulletin just released by N. F. Myers, manager of refineries for Union Oil Co. of California, J. N. Holden, former superintendent of maintenance, is appointed manager of the company's Oleum refinery. Mr. Holden is a native of Nevada, but has spent most of his life in California. He attended Oakland grammar and high schools, and graduated from the University of California at Berkeley in 1915, with a master's degree in mechanical and civil engineering. His first job after graduation was with the Redwood Manufacturing Co. of Pittsburg, Calif., and he had reached the position of chief engineer with that company when he received an appointment as refinery engineer at Union Oil Co.'s Oleum refinery in 1920. He has officiated in this capacity through a period that has witnessed many changes in refinery equipment and technique, and his capable discharge of the important duties involved was responsible for his present assignment as manager.

Completion Plan Aids Later Work

How the procedure of completing an oil well may be varied slightly in order to make certain that repair work which may be necessary in the future can be accomplished quickly and with less cost, is well illustrated in the following analysis of water locating jobs performed in a number of wells by the Dale Service Corp., operators of the Photoelectric Method of locating water intrusions. In each of these wells certain definite conditions were found to exist, and investigations of the logs revealed that the same practice had been followed in

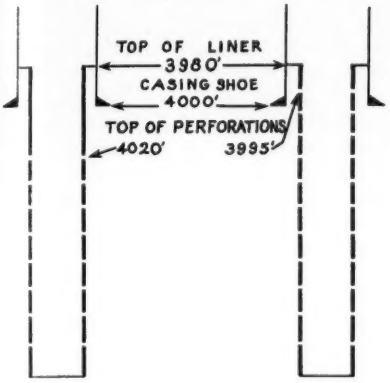


Fig. 1 Fig. 2

completing them. Reasoning from cause to effect, C. R. Dale, head of the company which bears his name, makes the following suggestions to point out how the completion work may be slightly altered, in order to insure that water intrusions may be easily located should they develop later during the life of the well.

The rather widespread practice of allowing a blank section of liner to extend from a point in the casing above the shoe to a point several feet below the shoe, has been found responsible for difficulty in ascertaining the exact source of entering water, in innumerable cases. This practice is not intentional in all cases. When the liner is made up, a full-jointed blank pipe is often attached above the perforated casing. When the liner is landed, the blank section extends past the casing shoe—perhaps several feet—as illustrated in Figure 1.

If, during the life of the well, water intrusion occurs at the casing shoe or immediately below it, the water will enter the well either at the top of the liner, unless a liner hanger of the packing type has been used, or at the top of the perforations.

Referring to Figure 1, if the water source developed at the casing shoe or somewhat below it, it can be indicated on water survey either at 3980, top of the liner, if the liner was not of the packing-off type, or at 4020, the top of the perforation, if the liner were packed off. Thus there would be an area of 20 feet behind the blank section of the liner in which no exact determination of the water source could be made unless the liner were pulled. As most water locating surveys are made with the liner in place, the results in such cases will be somewhat inconclusive because the perforations do not extend above the casing shoe.

Unless there are very definite reasons for extending the blank section of the liner below the casing shoe, it would seem to be better practice to allow the perforations to extend above the shoe, as shown in Figure 2. While this procedure may involve a slight extra expense in cutting and rethreading a length of pipe, it may save a considerable amount of money later on which might otherwise be spent in an attempt to locate the exact point at which the water is entering the well.

California Crude Oil Production

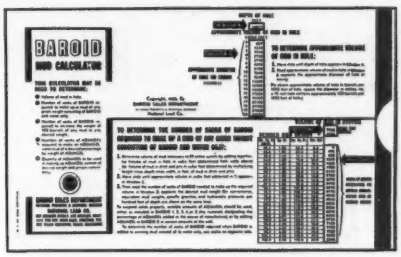
For Two Weeks Ended August 6, 1938

Field	August Daily Quota	Average Daily Production	Excess
San Joaquin Valley			
Belridge—North	14,950	12,187	*2,763
Belridge—South	1,790	1,026	*764
Buena Vista	17,330	17,040	*290
Canal	2,845	2,356	*489
Coalinga—East-West	16,510	9,347	*7,163
Coffee Canyon	3,110	3,484	374
Edison	2,560	2,566	6
Elk Hills	8,050	10,392	2,342
Fruitvale	6,835	6,850	15
Greeley	3,570	3,301	*269
Kern Front	8,100	7,238	*862
Kern River	5,405	2,617	*2,788
Kettleman No. Dome	63,380	66,381	3,001
Lost Hills	4,255	3,125	*1,130
McKittrick	3,445	3,491	46
Midway	44,040	39,900	*4,140
Mount Poso	14,540	14,675	135
Mountain View	9,220	9,770	550
Rio Bravo	3,190	5,778	2,588
Round Mountain	10,035	10,317	282
Ten Section	7,485	6,695	*790
Other Fields	2,576	2,874	298
TOTAL	253,221	241,410	*11,811
Coastal Counties			
Elwood	5,310	5,714	404
Rincon	2,995	4,285	1,290
Santa Maria	8,410	7,313	*1,097
Santa Maria Valley	19,065	2,046	*17,019
Santa Paula-Newhall	5,100	5,488	388
Ventura Avenue	32,125	34,970	2,845
Other Fields	5,570	5,825	255
TOTAL	78,575	65,641	*12,934
Los Angeles Basin			
Alamitos-Seal Beach	7,970	8,721	751
Brea-Olinda	8,505	5,684	*2,821
Coyote—East	2,765	3,765	1,000
Coyote—West	8,100	8,469	369
Dominguez	21,095	25,152	4,057
El Segundo	6,310	8,364	2,054
Huntington Beach—New	13,530	16,867	3,337
Huntington Beach—Old	13,495	14,085	590
Inglewood	13,980	13,113	*867
Long Beach	45,215	58,167	12,952
Montebello	6,530	6,425	*105
Montebello-West End	2,693	5,667	2,974
Playa del Rey	5,505	6,039	534
Richfield	7,920	7,987	67
Rosecrans-Athens	5,725	11,890	6,165
Santa Fe Springs	29,900	32,915	3,015
Torrance	11,091	16,673	5,582
Wilmington	66,455	92,522	26,067
Other Fields	2,670	3,043	373
TOTAL	279,454	345,549	66,094
STATE TOTAL	611,250	652,599	41,349

*—Shortage.

Baroid Mud Calculator

Designed to assist drillers in performing any necessary calculations in the use and control of drilling fluids, the Baroid Mud Calculator has just been prepared by the Baroid Sales Department of the National Pigments and Chemical Division of National Lead Co. This Calculator is a celluloid device working somewhat in the manner of a slide rule. It is 8 inches wide and 5 inches deep.



Among its various functions the Mud Calculator enables the operator to calculate quickly and easily the volume of mud in the hole, the amount of Baroid required to make a Baroid and water mud of a desired weight, and the amount of Baroid required to increase the weight of any mud to a desired point. The Calculator also aids in determining the quantity of material to be used in making up an Aquagel-water mud of a desired percentage by weight of Aquagel. Finally it aids in determining the quantity of Aquagel to be used in making up an Aquagel-cement of desired weight and proper consistency.

Volumes are given in cubic feet and barrels, while weight of mud is given in pounds per gallon, pounds per cubic foot, specific gravity, and pounds per square inch per hundred feet of depth. The Mud Calculator may be obtained from Baroid Sales Department offices at 837 Jackson St., Los Angeles, Calif.; 1111 Second National Bank Bldg., Houston, Texas; and 502 Tulsa Bldg., Tulsa, Okla.

Lunkenheimer Price Schedule

The Lunkenheimer Co. has recently issued a new 44 page List Price Schedule which supersedes all previously published list prices. It covers the entire line of Valves, Boiler Mountings, Lubricating Devices which are listed numerically by figure number.

These Schedules are available through Lunkenheimer Distributors in all industrial centers and from the Company direct:

The Lunkenheimer Co., Cincinnati, Ohio.

Development and Applications of Securaloy

Fully Recounted For the First Time

The same romance and color that glorified the gold rush days is the heritage of the oil industry, and the stories told of early oilfield "boom" days are as prolific and exaggerated as the stories of the golden west. But gold mining is a piker's game as compared with oil well drilling. Most gold mining operations ran into hundreds of dollars or even less, while drilling for oil runs into hundeds of thousands of dollars. Oil tool companies and engineers spend vast amounts each year perfecting methods for faster, safer, and less costly drilling operations, and only those who are interested in the success of the oil industry know of the hardships and experiments and failures and sweat that has gone into the industry to bring it up to the plane on which it now operates.

Modern oilfield practices are a result of years of experimental engineering and trial and error, and such is the story of "Securaloy",—the new drillable oilfield metal that is revolutionizing long-established production practices in the oil industry—and is rated by many as the outstanding development of recent years.

Actually some fifty different types of materials were thoroughly tested in developing "Securaloy" and here for the first time are some of the interesting "highlights" and results of that long period of research.

For a number of years, oil men had recognized the advantages of a drillable material for temporary and permanent production work. Later, as the idea took form, it became increasingly evident that there was a great need for drillable articles in regular production work, also, to eliminate many of the dangers encountered when production equipment became wedged or "frozen" in the hole. Such drillable articles would reduce the hazards and expense of fishing jobs, would permit fuller development of wells, and would make feasible many production efficiencies that were impractical with non-drillable equipment.

The material for such equipment would have to be *completely* drillable. It couldn't tear or break up into large sections that would clog the hole, but, instead, should drill into small chips that could easily be carried away by the circulating fluid. And this brought up another requirement—it must be sufficiently light so that the cuttings would stay suspended in drilling muds of ordinary viscosity instead of settling to the bottom of the hole to form a compact mass. In addition, to this there was the question of durability. Whatever the material was, it would have to be strong enough to stand up under the severe strains of heavy operations, and allow pipe wall thicknesses and other sectional areas to be maintained in reasonable and practical dimensions.

It also had to be resistant to reasonable temperatures, erosion, oil, saline solutions, mud, sulphur compounds, and a wide variety of other destructive elements for an indefinite period of time.

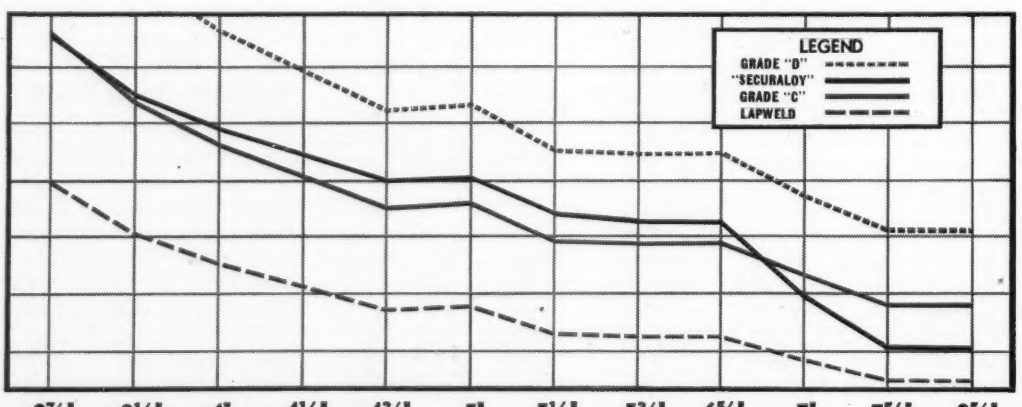
Then, too, a number of other factors had to be taken into consideration if the material was to be a commercial success. It should be easy to fabricate into a variety of different products without special equipment, so that the safety advantages of a drillable liner, for example, wouldn't be nullified by non-drillable connecting collars, shoes, hangers, etc. And, of course, the cost of the material had to be low enough to make it economically sound.

Long periods of intensive research and experiment culminated in a metal which had all of the aforementioned requirements and verified the hopes and expectations of the inventors. Subsequently, this metal was given the name "Securaloy".

The development of "Securaloy" opened up a field of possibilities so large that every day new applications for its use are discovered, and these new applications, in turn, widen the scope of drilling by making possible procedures which before had only been vague dreams. As soon as "Securaloy" was developed, Security Engineers changed their course of tactics and started working towards the solution of intricate and costly oilfield problems. As more and more uses were developed, the material was fabricated into a great variety of products, until today, liners, adapters, liner hangers, packers, and countless other pieces of subsurface equipment are made of it.

Physical Properties

One of the first questions generally asked about "Securaloy" is concerning its strength, and the accompanying graph shows the strength—depth figures for "Securaloy" as compared with grade "C", grade "D" and lapweld casing. Note that "Securaloy"



THIS GRAPH ILLUSTRATES THE RELATIVE COLLAPSE VALUES FOR THE VARIOUS GRADES OF STEEL PIPE AS COMPARED TO "SECURALOY" PIPE

falls roughly between grade "C" and grade "D" figures.

Another point often brought up concerns the specific gravity of this metal. "Securaloy" has a specific gravity of 2.69, which is about the same as the specific gravity of light shale. Thus, it can be seen that "Securaloy" cuttings will readily circulate in normal muds and will behave very much the same as shale cuttings.

The drilling rate of "Securaloy" varies with the individual job. Straight "Securaloy" pipe and fittings can be drilled up at an average rate of twenty to thirty lineal feet per hour, but if the pipe is surrounded with cement or packed solidly with sand, the rate naturally falls off.

Typical Uses

New uses for the metal are also being developed as more and more operators adapt the material to their particular problems. It is ideal for isolated zone multiple production work and its use in the Wilmington-Long Beach field has made an entirely new production technique that was not practical with non-drillable equipment. Nearly a hundred wells in that one field alone have used "Securaloy" equipment in their operations, and have definitely proven its versatility.

In addition to multiple production work—"Securaloy" has a wide field of other practical applications. For example, many major companies are now setting "Securaloy" liners for regular production work. The liner is used the same as conventional equipment and when reconditioning the well becomes necessary, it can be pulled in the same manner as an ordinary liner, but if the liner is frozen so that it cannot be pulled, then, it is only necessary to drill up the liner (Figure 1), clean the formation, and set a new one—a definite saving in time, labor, and material.

Secondary Water Shut-offs

Another interesting "Securaloy" application is its use for sealing off water leakage around the shoe of the last water string. In this case a portion of the hole below the shoe is enlarged and a "Securaloy" liner equipped with a drillable cementing basket is run in the hole and cemented through ports above the basket (Figure 2). The basket keeps the cement out of the producing zone and the body of cement surrounding the liner effectively shuts off any water leakage from above. Whenever desired the liner and cement can be quickly drilled up and circulated out of the hole.

Drillable Windows

Often it is desired to deepen a well in order to tap a new oil zone and the operation of milling through steel pipe is generally an expensive and uncertain one. However, operators have found that by placing a section of "Securaloy" pipe at a suitable location in the oil string they can quickly whipstock through this drillable section whenever desired. In Figure 3, this application is illustrated before the hole has been carried out through the drillable section at the top. In this particular illustration a section of smaller "Securaloy" pipe has also been made up at the bottom of the string. When the bottom zone is no longer profitable, an ordinary drilling bit lowered through the larger top section will remove this tailpiece so that a cement plug can be effectively placed to sheath off this zone, or, if the oil string is not too small, development can be carried deeper at the option of the operator.

Cementing Work

Being drillable, "Securaloy" naturally fits hand-in-glove with various types of cementing operations. An important application is the one illustrated in Figure 4. Here a "Securaloy" tail pipe ten or more feet in length is attached to the bottom of the string by means of a drillable reducer, and holes drilled near the bottom of this tail pipe provide for the discharge of the cement.

This cementing method has several advantages. In the first place the cement turbulence is kept at a distance below the shoe thus eliminating any danger of cutting the walls away at that point. Then, too, the flow of cement has time to smooth out before it reaches the shoe, thus assuring a solid cement body around the string and reducing the danger of "channelling". When the plug strikes bottom, the cement tailings remain inside the pipe and only the good mud-free cement sets up around the shoe and casing.

(Continued on Page 26)

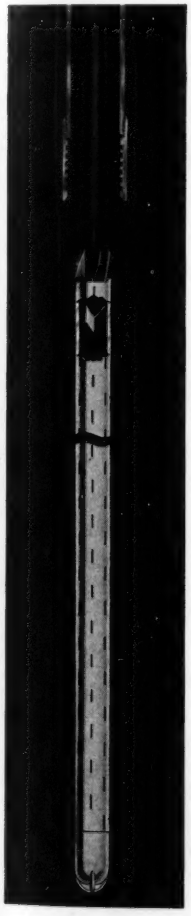


Figure 1

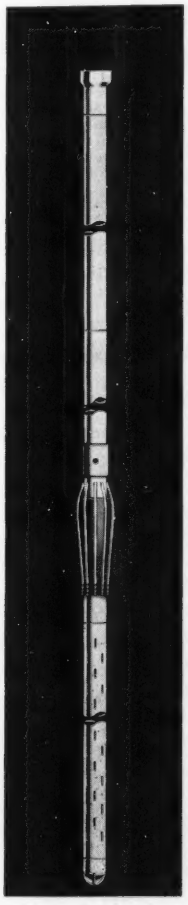


Figure 2

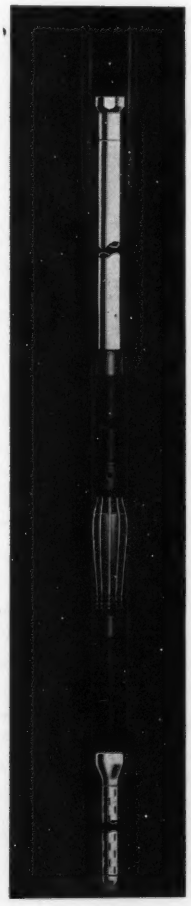


Figure 3

Over 70 wells
SECURITY DR
BRING *new* DEVI

Progressive operators everywhere are adopting the modern production techniques made possible by "Securaloy," the new drillable metal, and by the complete line of Security Drillable Products manufactured from it.

In the Wilmington-Long Beach Harbor Field alone over 70 wells have used Security Drillable Products in regular and multiple production work. In other fields the acceptance of these products has been equally outstanding because this equipment puts completely new production efficiencies within reach.

By methods never before feasible you can get more from your development dollar...obtain greater oil production at less cost...and safeguard your oil well investment with subsurface equipment that can be used the same as steel, yet can be completely drilled up whenever necessary!

"SECURALOY"

"Securaloy" is the drillable metal developed by Security engineers especially for oil field use.

★ It is Strong, having strength factors that compare favorably with those of steel.

★ It has High Erosion and Corrosion resisting qualities, with unusual resistance to sulphur compounds and other corrosive chemicals commonly found in oil wells.

★ It has Low Specific Gravity, the cuttings readily circulating out of the hole with the drilling fluid.

★ And, above all, it is **Drillable!**

And here's an important point. The drillable feature of "Securaloy" has led some to believe that it is primarily a metal for testing production possibilities only. "Securaloy" is used extensively for safely testing new zones. Then, if the zone proves barren, it is drilled up to allow deeper exploration. But its most important role is the **permanent protection** it affords your wells. It can be left in the hole indefinitely the same as conventional equipment, and used for regular production work. Think of the efficiency and permanent protection this feature provides!

"Securaloy" is manufactured into Security Drillable Liners and Blank Pipe (supplied in a wide range of sizes), and into a complete selection of drillable subsurface items, such as Bull Plugs, Adapters, Collars, Reducers, Subs, etc. to meet all production needs.

SECURITY DRILLABLE PRODUCTS

make every well a safer investment!

Get the complete details on these Security Products today. Learn how you can lengthen the producing life of your wells . . . how you can leave drillable windows in your casing to aid subsequent development operations . . . how you can efficiently seal off water and gas zones in old producing zones . . . or, if formations are favorable, how you can adapt multiple production methods to your wells. Our engineering staff will gladly work with you on your particular problems. No obligation, of course.

...field prove that—
...BLE PRODUCTS
...ENT EFFICIENCIES!

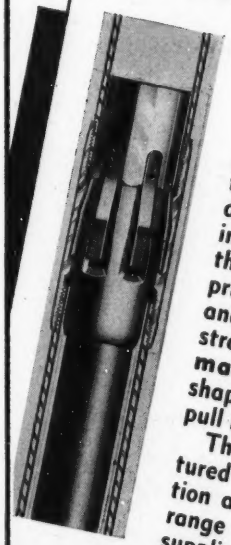
SECURITY LEAD SEAL PACKER

This Packer is used extensively in multiple production work. There are no slips to jam, and it requires no twisting or turning to set. It has springs that pass freely through casing couplings but catch **automatically** in the specially-formed recess of a Hook Collar placed at the desired point in the casing string. This locks the tool against further downward travel and expands the Lead Packer to form a fluid-tight seal between the outer and inner string.

A special Security Circulating Joint can be run above the Packer, if desired, to provide an easily opened valve between the inner and outer strings for bringing in the well. Raising the run-in string opens two ports in the side of the Joint—lowering it closes them. A Lead Seal automatically makes the Joint fluid-tight in the closed position.

Both the Packer and Circulating Joint are particularly adapted to drillable construction as everything except the short spring fingers can be made of "Securaloy." Also supplied in conventional steel construction, if desired. A full range of sizes and types to fit every casing string is available.

SECURITY HOOK-COLLAR LINER HANGER



This is a radically different type of Liner Hanger that has no slips to jam, and nothing to twist or turn when setting. It eliminates danger of setting the Liner too high, or too low, in the hole and is always reliable. It utilizes the same efficient spring and recessed-collar principle as the Lead Seal Packer (at left) and will carry the heaviest liner loads without strain. Just run it in the hole. It sets **automatically** when it reaches the specially shaped recess of the Hook Collar. A straight pull instantly releases it!

The Hook Collar Liner Hanger is manufactured both of "Securaloy" Drillable construction and regular steel construction in a full range of sizes. Special Hook Collars can be supplied for **all** types of casing and threads!

SECURITY ENGINEERING CO., INC.

WHITTIER, CALIFORNIA, U. S. A.

EXPORT: SECURITY ENGINEERING CO., INC., 420 LEXINGTON AVE., NEW YORK, NEW YORK, U. S. A.

SIEVERS REAMERS ★ SECURALOY
SECURITY DRILLABLE PRODUCTS

"SECURALOY" REGISTERED TRADE MARK

(Continued from Page 23)

When a well is drilled through to the oil sand, certain states require that at least a ten foot cement plug be placed between the casing shoe and the sand. By using the cementing method just described—the plug is formed below the shoe and the cement is placed around the casing, all in one operation without raising the casing. After the cement has set, the plug and "Securaloy" "stinger" are drilled out in the conventional manner.

Sheathing or "Scabbing" Jobs

Another operation with "Securaloy" that should prove of interest, because of its multiplicity of applications, is what is commonly termed a "scabbing" job, which consists of placing a sheath inside of the existing casing or liner. This type of job can be advantageously applied to almost every well sometime during its career. It is used to blank out bad casing or liners, to prevent encroachment of sand, gas, or water, or to isolate any section of the well from the production string. A typical example of this type of job was run in the Wilmington-Long Beach field at the time this article was being written. The liner on this well had collapsed and the perforations were eaten away. This had permitted sand encroachment and had appreciably reduced production.

This problem was solved by running Sievers Reamers in progressive sizes with smooth, tapered rollers until the liner was brought back to its original I.D. Then a "Securaloy" slip type liner hanger with a double lead seal was set below forty feet of perforated "Securaloy" liner. When this was set, a "Securaloy" lead seal packer was set on top of the perforated liner. This completed the "scabbing" operation, and normal production was regained.

In case of trouble in later years the equipment in this operation is made of "Securaloy", and it may be easily drilled up, circulated out, and the hole cleaned out for other installation or operation.

There are many more interesting applications for this new metal, and even as this article is being written Security Engineers have new time and money saving devices under way. A perpetual survey is being taken on oilfield problems of various companies and these engineers work to solve these problems in order to further the industry by saving time and labor and expense and by keeping the safety factor always in mind. It is safe to say that, in a comparatively short length of time, very few wells will be drilled without using "Securaloy" equipment, so it may not be long before every oil well will have nine lives and "drilling bits" will be listed under fishing tools—all because of a metal called "Securaloy"!

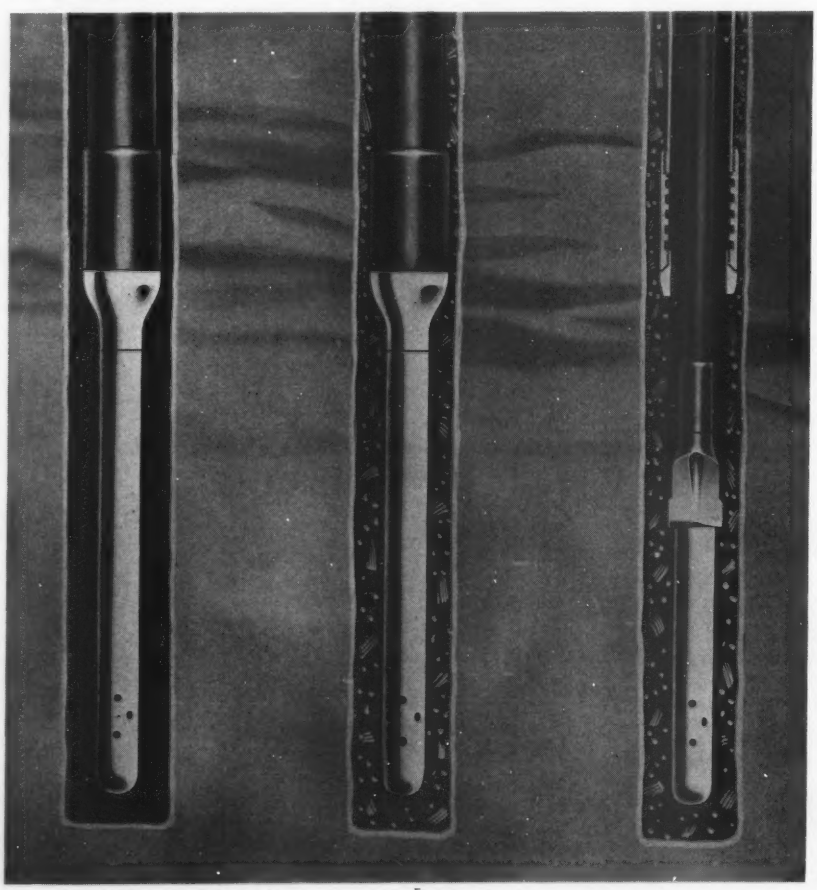


Figure 4

In the announcement of the appointment of Petroleum Equipment Co. as California distributors for the Bethlehem Seamless Oil Country Tubular Goods, on Page 12 of this issue, it should be noted that Petroleum Equipment Co. has large offices in San Francisco as well as Los Angeles and field offices and warehouse in East Coalinga, as well as Taft, Bakersfield, Long Beach, Kettleman Hills, Santa Fe Springs, Wilmington, Santa Maria, and Fillmore.

Dubbs Cracking Royalty Halved

Universal Oil Products has just announced a reduction of 5 cents a barrel throughput for Dubbscracking, thus cutting the present rate of 10 cents a barrel squarely in half. Substantial reductions likewise are being made in the rates for reforming and viscosity-breaking operations.

The new rates, which take effect October 1, apply only to refiners, some 60 in number, using the process in the United States.

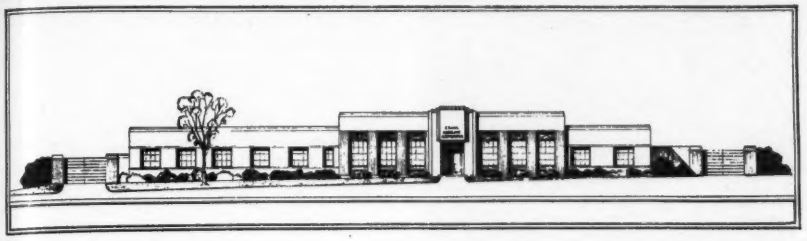
When the first commercial Dubbscracking unit was put in operation in 1919, the royalty was 15 cents a barrel and the yield of gasoline guaranteed by Universal was 21 per cent.

In 1934 when the 15 cent rate was cut one-third, gasoline yields had reached 50 per cent and more.

Today, many refiners are getting yields of 60 per cent or considerably better from their Dubbscracking operations—stabilized gasoline of suitable vapor pressure, high volatility and high octane rating.

Universal has also developed and is developing other important refining processes, including catalytic polymerization, iso-octane production, catalytic, cracking, catalytic reforming, alkylation and production of aromatics, as well as U.O.P. gasoline inhibitors.

New Ethyl Gasoline Research Laboratory



The ideal climate and favorable terrain of Southern California have been harnessed to play an important part in the designing and the construction of the automobile of tomorrow. At least this seems to be indicated from the far-reaching activities in this area of the Ethyl Gasoline Corp. during the past few years. These unique Ethyl activities are planned to serve totally different purposes: One, a comprehensive campaign of "clinical education" in behalf of the motorist and service station attendant, and the other the completion in September of the Ethyl Engineering Research Laboratory at San Bernardino, in behalf of the refiner and automotive equipment manufacturer. In each instance certain conditions favorable to Southern California, will serve to assure greater success than might be possible were the activities conducted elsewhere.

Quite recently, what was announced as another "California First" was the opening of the Ethyl Permanent Clinic, the first of its kind in this country, at 977 West 6th Street, Los Angeles. Recognizing its importance Earle W. Webb, president, and J. Coard Taylor, vice president, of the Ethyl Gasoline Corporation, journeyed from New York to Los Angeles to assist S. M. Wagner, Pacific coast manager, in launching the project. The Permanent Clinic followed closely a former "California First", the Ethyl Portable Clinic which originated in Los Angeles two years ago. The Portable Clinic proved so successful on the west coast, the company immediately ordered eleven duplicate units built for use in other parts of the United States. Individual oil companies have since adopted the Ethyl Portable Clinic idea and are using it on an abbreviated scale as a part of their educational field work.

High compression ratios are in part accountable for the flashy performance of modern cars. To get the most of this performance fuels suitable to the engine should of course be used. It is to this end the Ethyl Clinics, originated in Los Angeles, will be held in a hundred cities within the next twelve months.

The transition from low grade to high grade fuels, and from low compression to high compression—the outcome of the discovery of tetraethyl lead as an effective anti-knock agent, has been accomplished. Its advantages, however, are not clear to all owners of motor cars. To visualize realistically the progress that has been made, and the importance of proper motor adjustment, the Ethyl educational clinics were founded.

Current curiosity, however, is being sharply focused on the new Ethyl building fast approaching completion at 2600 Cajon Road in San Bernardino. Briefly, the San Bernardino building is a branch of the Ethyl Engineering Laboratory at Detroit under the direction of Earl Bartholomew. The foundation stone for the San Bernardino project was laid three years ago, when a motorcade of trucks, tractors and motor cars was sent on an endurance test From Detroit to San Bernardino. It was a $100,000 experimented, and in this gruelling cross-country grind from Michigan to California, via Nebraska, Wyoming, Utah and over the desert of southern Nevada a series of most exhaustive tests was started. The journey was made over all types of roads under varying weather conditions, that called for engine and fuel behavior far from the ordinary.

Upon arrival of the equipment in Southern California the endurance tests were continued over the wide variety of roads available there. Tests on various grades were made at elevations ranging between 200 feet below sea level and 7000 feet above within a reasonable distance of San Bernardino, and on one road alone the elevation changes almost 6000 feet in 35 miles, with 12% grades occurring at some points. Also, the Muroc Dry Lake, twelve miles long, notable for its remarkable flatness and smoothness, permitted indefinitely sustained speeds as high as the engines were capable. Obviously the tests made and the engine performance charted, were of inestimable value to those American manufacturers who supply automotive equipment all over the world.

Only in Southern California can such natural diverse factors be found within a driving radius of a few miles. The results from the motorcade tests and subsequent work in the area therefore decided the selection of San Bernardino for the site of the up-to-minute Ethyl engineering laboratory fast nearing completion. It is expected to open its doors within the next few months. The new laboratory will be in charge of William O. Schulze, who has been with the Ethyl organization ten years. Mr. Schulze is a graduate of the School of Engineering of the University of Oklahoma. He spent considerable time under Director Bartholomew in the research department at Detroit.

A chassis dynamometer is being installed to permit both cars and trucks to be tested at full load conditions which simulates actual road operations, and has the advantage over road operation of permitting accurate and rapid measurement of air-fuel ratios, compression pressures and optimum timing under any condition of operation. It provides as long and steep a grade as desired. Other equipment for testing valve material and spark plugs is included. There will be a separate ignition room to test distributors. Also, there will be a standard variable compression engine for rating the antiknock value of motor fuels. The same type of equipment that is installed at Detroit for the blending and dispensing of gasoline, and for control of road tests will also be available.

Most of us have probably forgotten that the average car in 1925 burning the fuels then available, was a model of inefficiency and poor performance. Since that time horsepower per cubic inch of displacement has increased nearly 80%. Of this increment, nearly half has been contributed through the use of fuels of high antiknock value. This has resulted in improvement in thermal efficiency, in cooling, car weight and length, fuel economy, general car performance and cost of manufacture. Research, in which Ethyl engineers played no small part, brought these changes about. Today's cars as a result of research, will be able to develop approximately 800,000,000 more horsepower than they would have been able to produce in 1925. Furthermore each horsepower will be delivered at a substantially higher thermal efficiency on the improved fuel.

Ethyl engineers also point out that the horsepower of a 616 cubic inch bus and truck engine has been increased about 15% through increase in compression ratio and the use of fuels of antiknock quality. No high compression farm tractor was placed on the market until late in 1935. But today, in a comparison of the evolution of high compression in the automobile to that in the tractor, it will be observed that for the tractor the development is proceeding at an even more rapid rate.

New Associated Oil Tanker Reaches Pacific Coast Waters

Welcome to the port of San Francisco was accorded Captain Leland E. Hawkins upon the arrival at the famed west coast seaport of the new Tide Water Associated Oil Company tanker "S. S. Associated" recently. The San Francisco Junior Chamber of Commerce represented by its Marine Committee, presented Captain Hawkins with a framed photograph of the great harbor as a welcome to the new vessel in its home port. Left to right: Tyson Weihe, vice chairman San Francisco Junior Chamber of Commerce marine committee and Captain L. E. Hawkins of the "S. S. Associated".

Constructed by the Sun Shipbuilding and Dry Dock Co. in Chester, Pa., the S. S. Associated represents the most modern development in large, ocean-going tankers. She is 459 feet 6 inches overall length with a molded breadth of 65 feet. She has a draft of 28 feet 8 inches. Displacement, molded, at international tanker summer draft, is 17,320 tons. Dead weight at international tanker summer draft is 12,752 tons. Gross tonnage is 8,407 tons and net tonnage is 5,931 tons.

The cargo capacity, 98% full is 103,417 barrels, while the fuel capacity, 98% full is 10,450 barrels. She has a carrying capacity of 4,300,000 gallons of gasoline.

The speed of the S. S. Associated, loaded, on trial, is 13.4 knots, while her cruising radius is 19,000 miles—65 days. She carries a normal crew of thirty-seven.

The S. S. Associated is driven by 3600 horse power steam turbines, and 2 water tube, high pressure main boilers of a new super-heat-control type.

Construction of the big tanker was started with the laying of the keel on November 9, 1937. She was launched on June 9th and was christened by Mrs. E. L. Shea, wife of the Executive vice president of Tide Water Associated Oil Co.

Following the launching, the new ship was given sea trials and was delivered to the company on June 28th.

Carrying 84,000 barrels of lubricating oil from the Tide Water Associated Oil Co. refinery at Bayonne, N. J. the S. S. Associated will make deliveries at Los Angeles and San Francisco upon completion of her maiden voyage through the Panama Canal.

Representing the latest development in oil tanker construction, the S. S. Associated is equipped for utmost comfort, safety and convenience for her crew. A new feature, a lounge and recreation room fitted with easy chairs, settees, radio, card tables, and other attractions is provided. The crew sleeps in staterooms, no more than two to a room. Each room is provided with running hot and cold water, wall plug for radio. The ship is particularly well equipped in its dining, sleeping and bathing accomodations.

Every effort has been made to turn out a ship which is modern in crew accomodations over the estimated 20 year life of the vessel.

Navigation instruments are of thoroughly modern type and include radio direction finder, Sperry Gyro Compass and an electric depth finding device.

Following her delivery of oil in Los Angeles and San Francisco, the S. S. Associated will be placed in regular operation, both domestic and foreign, with San Francisco as her home port.

The boiler equipment of the "Associated" is of particular interest as it is the first of its type in merchant marine service anywhere. This does not imply radical design but rather a logical combination of engineering principles all thoroughly proved in service. It is an evolution in design resulting directly from the development of more effective and efficient turbine drives for merchant steamers.

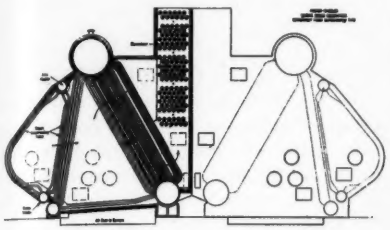
In order to operate a turbine at maximum efficiency, it should be furnished with the highest pressure and highest temperature steam advocated by the manufacturer. Although this is relatively simple in stationary practice, a serious complication arises in marine service due to the sudden and sometimes frequent reversals of the turbine that are necessary while maneuvering. The construction of steam generators in the past has been such that if the reversing or maneuvering is quickly carried out, the tendency of the superheater is to provide a higher final steam temperature than under normal operating conditions. In other words, the superheater becomes very warm while no steam is passing through it and when the throttle is next opened the temperature is much higher than desirable.

A closely allied condition is that the temperature of turbine blading will fall rapidly when no steam is passing through the turbine, and to subject such relatively cool rotors to a high steam temperature is to impose an undesirable temperature shock of excessive severity.

Furthermore, many marine old line boilers have been so constructed that the production of small amount of superheated steam resulted in overheating superheater elements and causing sufficient damage to require replacements.

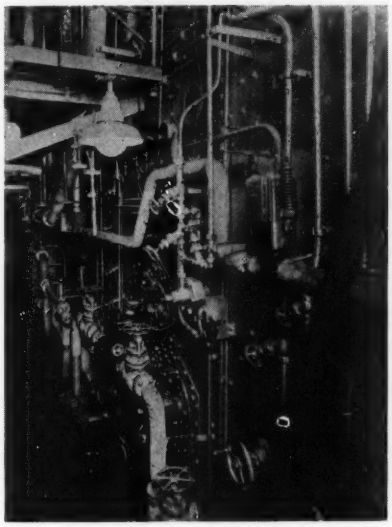
To overcome these costly limitations a complete marine steam generating unit good for 120,000 lb. steam per hour was built and tested extensively at 600 lb pressure and 850 deg. F. final steam temperature. All requirements were met and the unit responded even more sensitively than had been anticipated. The basis of design was to provide a separate furnace for superheating the steam, but to incorporate it within the setting of the boiler unit. This was accomplished

by modifying the three-drum, "A"-type marine steam generator design, already in successful use on merchant and naval vessels. With the new arrangement steam is generated in the boiler proper and passed to the separately fired superheated, having its independent oil firing for superheating the steam. The gases from the superheater furnace pass through a shallow screen of superheater furnace whence they pass over boiler and boiler tubes into the main boiler heating surface and economizer surface to the stack. The accompanying drawing shows the general design which is at once simple, accessible and easy to maintain.



Most of the superheating is the result of radiant heat applied to superheater tubes which form the top, bottom and sides of the superheater furnace. The temperature of superheated steam is controlled directly by the rate of firing the superheater furnace, and any desired amount of saturated steam may be taken directly from the boiler drum without the complication of a desuperheater, and without affecting the temperature in the superheater steam line.

Operation of these separately fired superheater boiler units has shown that a moderate superheat may be obtained in the superheated steam line, without the superheater burner in operation, due to the proximity of the main boiler furnace. Saturated steam, as stated, is taken directly from the steam drum. It thus becomes evident that regulation of the final steam temperature is a definite and automatic protection against the overheating of superheater tubes. The rate of firing of the superheater furnace is controlled with a fixed maximum limit, and as the steam quantity is reduced the firing is correspondingly reduced and the tubes are not overheated. This is regardless of the quantity of steam being produced.



Front View of Boilers

Due to the superheat being effected almost entirely by radiant heat, the final temperature is particularly sensitive to control through manipulation of the oil burner. This has the great advantage of reducing any influence of heat emanating from masses of refractory or hot gases and creating an undesirable rise in the temperature of superheater tubes, even with oil burners shut off. It has been found easy to control the steam temperature within less than 5 deg. F.

In other words, the range of steam temperature available includes:

Saturated steam—any quantity desired for ship use without affecting the superheated steam supply.

Moderate superheat—from the superheated steam lines without firing the superheating furnace. Final temperature about 550 deg. F.

Superheated steam—range from 575 deg. F. to 850 deg. F., subject to instant regulation for reversing, maneuvering, or any condition of turbine operation—regardless of quantity of steam used.

UNION OIL COMPANY OF CALIFORNIA
NATURAL GASOLINE PRICES FOR ITS CURRENT PURCHASES IN THE FIELD
EFFECTIVE 7:00 A.M. AUGUST 1. 1938
PRICES IN CENTS PER GALLON IN FIELDS INDICATED

PRICES IN CENTS PER GALLON IN FIELDS INDICATED

V.P. #/Sq. In. Reid @ 100°F.	Richfield	Huntington Beach, Long Beach	Brea	Santa Fe Springs	Dominguez	Rosecrans	Playa del Rey	Santa Paula	Santa Maria	Midway-Sunset, North Belridge	Kr't'leman Hills, Rio Bravo, Mountain View
15—15.9	7.59	7.59	7.59	7.59	7.59	7.59	7.59	6.98	7.34	7.09	7.15
16—16.9	7.41	7.41	7.41	7.41	7.41	7.41	7.41	6.80	7.16	6.91	6.95
17—17.9	7.23	7.23	7.23	7.23	7.23	7.23	7.23	6.63	6.98	6.73	6.76
18—18.9	7.04	7.04	7.04	7.04	7.04	7.04	7.04	6.45	6.79	6.54	6.57
19—19.9	6.86	6.86	6.86	6.86	6.86	6.86	6.86	6.32	6.61	6.36	6.38
20—20.9	6.68	6.68	6.68	6.68	6.68	6.68	6.68	6.28	6.43	6.18	6.19
21—21.9	6.50	6.50	6.50	6.50	6.50	6.50	6.50	6.25	6.25	6.00	6.00
22—22.9	6.34	6.34	6.34	6.34	6.34	6.34	6.34	6.22	6.09	5.84	5.81
23—23.9	6.19	6.19	6.19	6.19	6.19	6.19	6.19	6.22	5.98	5.69	5.62
24—24.9	6.03	6.03	6.03	6.03	6.03	6.03	6.03	6.20	5.92	5.53	5.42
25—25.9	5.89	5.89	5.89	5.89	5.89	5.89	5.89	6.19	5.86	5.39	5.24
26—26.9	5.80	....	5.83	5.82	5.83	5.83	5.84	6.18	5.81	....	5.05
27—27.9	5.76	....	5.80	5.80	5.80	5.81	5.83	6.17	5.78	....	4.86
28—28.9	5.71	....	5.78	5.78	5.79	5.80	5.83	6.15	5.76	....	4.66
20—29.9	5.68	....	5.76	5.77	5.78	5.79	5.82	6.12	5.74	....	4.47
30—31.9	5.63	....	5.74	5.76	5.76	5.77	5.80	5.89	5.70	....	....
32—33.9	5.59	....	5.71	5.75	5.75	5.75	5.78	5.57	5.68	....	....
34—35.9	5.54	....	5.68	5.72	5.71	5.72	5.75	....	5.64	....	....
36—37.9	5.48	....	5.65	5.67	5.66	5.69	5.70	....	5.58	....	....
38—39.9	5.42	....	5.61	5.63	5.59	5.63	5.65	....	5.52	....	....
40—41.9	5.35	....	5.56	5.58	5.50	5.58	5.58	....	5.43	....	....
42—43.9	5.25	....	5.51	5.52	5.39	5.49	5.51	....	5.32	....	....
44—45.9	5.16	....	5.46	5.46	5.25	5.38	5.42	....	5.18	....	....
46—47.9	5.03	....	5.41	5.37	5.11	5.25	5.33	....	....	....	....
48—49.9	4.90	....	5.35	5.28	4.96	5.09	5.22	....	....	....	....
50—51.9	4.77	....	5.30	5.18	4.77	4.90	....	....	....	....	....
52—53.9	4.64	....	5.24	5.08	....	4.68	....	....	....	....	....
54—55.9	4.52	....	5.16	4.97	....	4.48	....	....	....	....	....
56—57.9	4.39	....	5.08	4.87	....	....	....	....	....	....	....
58—59.9	4.26	....	4.97	4.76	....	....	....	....	....	....	....
60—61.9	4.14	....	4.86	4.66	....	....	....	....	....	....	....
62—63.9	4.01	....	4.71	....	....	....	....	....	....	....	....
64—65.9	3.88	....	4.55	....	....	....	....	....	....	....	....

Galvanizing Installation Features

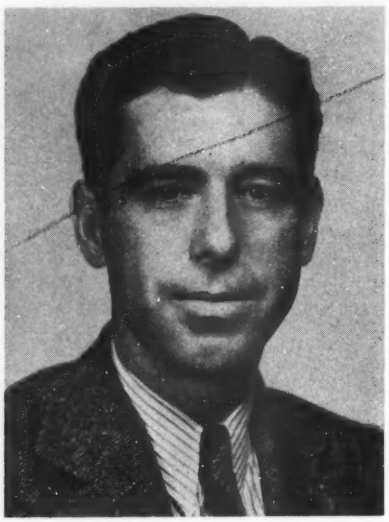
Facility and Economy

By J. A. Monax*

The Emsco Derrick & Equipment Co. of Los Angeles has recently installed a new galvanizing plant incorporating the latest and most efficient gas-firing practice. Before proceeding with the new plant, however, an investigatiion was made of several of the latest gas-firing galvanizing installations in the local area. The Emsco management was so favorably impressed with these installations, both from the standpoints of cost and operating facility, that a similar application for its new plant was decided upon.

Particularly impressive were the fuel consumption estimates which were supplied by heating engineers previous to the installation. There are three definite factors which go to make up the monthly fuel consumption on a galvanizing pot:

First, fuel consumption for holding the pot at temperature over nights and over week-ends, consisting of radiation losses from the setting and top of the bath, and flue gas losses;



J. A. Monax

Second, the fuel required to hold the pot at temperature for producing galvanizing, consisting of radiation losses from the setting and top of the bath, and flue gas losses; and

Third, fuel required for actual production through the pot, consisting of heat required to melt the spelter and heat required to bring the steel or iron up to the temperature of the spelter.

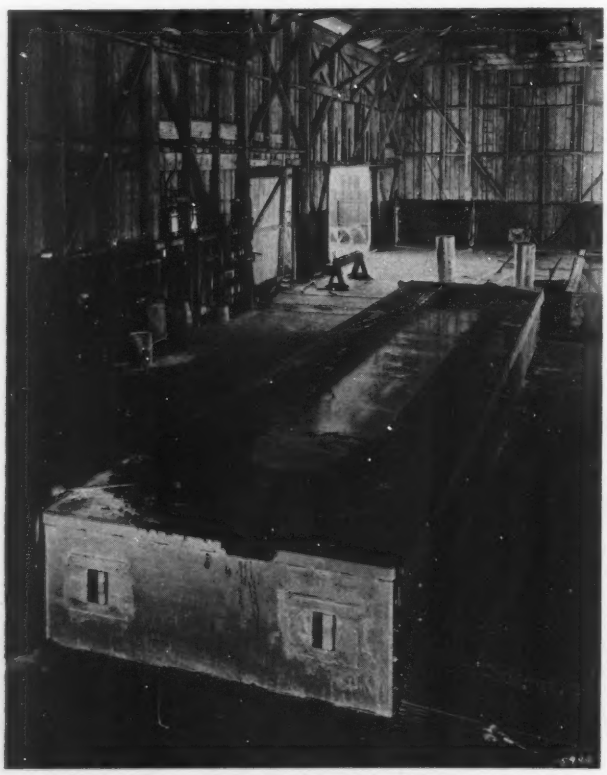
Utilizing these three factors, it was possible to predict in advance the fuel cost for galvanizing on practically any basis of operation, from one day a week to 24-hour operation six days a week. It was found in the other gas-fired galvanizing installations that similar fuel consumption estimates had been exceedingly accurate. An additional factor which impressed Emsco officials was the decided improvement in working conditions for the personnel operating the galvanizing kettle by the immeasurable reduction of heretofore excessively high room operating and floor temperatures. So, the procedure was made with the utmost confidence.

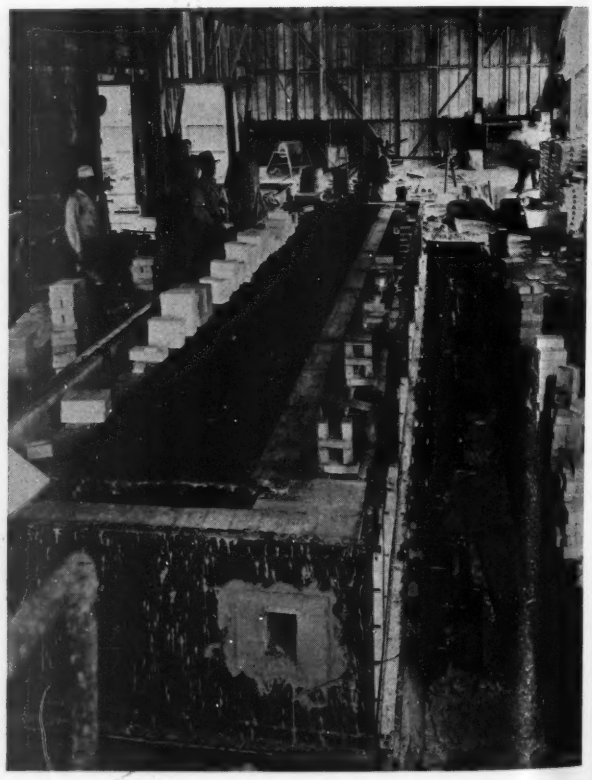
The Galvanizing Equipment

The plant at Emsco consists of one galvanizing kettle, 30 feet, 6 inches long by 36¾ inches wide by 41½ inches deep, with the usual pickle and wash tubs, and an 85-horsepower Horizontal Return Tubular boiler. High pressure natural gas at 15 pounds per square inch pressure is available from the natural gas lines at this plant, so that the boiler and galvanizing kettle are fired with high pressure firing equipment.

The boiler is fired with two Type 11C N.G.E. boiler burners, provided with an

* Natural Gas Equipment, Inc. engineer for surface combustion equipment.





N.G.E. pilot burner, and the gas supply to the burners is controlled automatically by the steam pressure on the boiler by means of an N.G.E. Wilgus Gas Fuel Regulator. The boiler burner is designed for operation on a maximum of 3 pounds gas pressure; so an N.G.E. Wilgus reducing regulator is placed on the line ahead of the boiler feed regulator to reduce the gas pressure from 15 pounds line pressure to a maximum of 3 pounds going into the gas fuel regulator.

The galvanizing kettle installation was designed by Natural Gas Equipment, Inc., and the control and combustion equipment was furnished by them. The kettle itself is of 1¼-inch firebox steel with the side and bottom in one continuous plate, with the end plates welded inside. The kettle is fired along the entire length of both sides by 50 Surface-Combustion impact type burners spaced at uniform intervals and firing into refractory beds of suitable material to withstand the temperature and combustion action and eliminating any direct flame impingement on the steel. The firing is arranged to introduce all of the heat above the dross line, thus protecting the kettle and preventing the constant circulation of dross in the spelter bath and insuring a smooth, tight galvanized coating. The pot is on automatic control 24 hours a day, 7 days a week, whether on production or merely holding.

Leeds & Northrup supplied the recording pyrometer controller.

Improvement of working conditions and increased comfort are assured by complete refractory insulation around the entire pot. The firing equipment is entirely below the floor line, extending the length of the kettle and is covered over with cover plates, making the floor around the kettle entirely clear for the workman. The firing equipment on this kettle is designed for a maximum production of 12,000 lbs. per hour. Greater capacities could have been readily provided, but it would have been at the expense of reduced pot life.

This tonnage will take care of all normal requirements and it was decided that it would be much more economical to keep the production within these limits than to set up for larger tonnages at the expense of shorter pot life, in view of the fact that larger tonnages can only be delivered through the pot on very rare occasions on special orders.

A considerable portion of the tonnage through this kettle consists of Emsco Steel Drilling Derricks and auxiliary equipment.

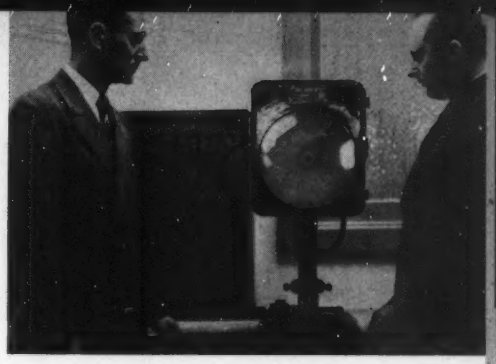
Many cotton farmers pay $50 to $60 a year in automotive taxes, the major part of which are gasoline taxes.

Integrator Expert Demonstrating Here

J. L. Cottrell, Manager of the Integrator Division of the Pittsburgh Equitable Meter Co. of Pittsburgh, Penna., is in California and will spend several weeks on the Pacific Coast with the local district offices of this company, demonstrating the Emco McGaughy Integrator and the new Emco Orifice Meter.

The Emco McGaughy Integrator is an ingenious, electrically operated, mechanical device employing the square root cam theory and is designed to compute the total extension on orifice meter charts. Fountain pens are provided which superimpose ink tracer lines over the original chart record and a continuous type counter is used which makes it possible to check the counter differences on any group of charts calculated. The square root cams on the Integrator are calibrated to an accuracy within one-tenth of one per cent. One operator can compute 300 average charts per day with the Integrator.

Some of these original Integrators have been in constant use over a period of ten years. Continued factory research combined with actual application of the machines in service has resulted in its present state of efficiency. The development of the Integrator is a very important step toward perfection of orifice meter measurement.



J. L. Cottrell, right, with H. Boezinger, district manager of Pittsburgh Equitable Meter and Merco-Nordstrom Valve Cos. viewing Emco Orifice Meter.

The new Emco Orifice Meter is an improved design of the same basic principles that have been used on this meter for a number of years. The forgings on the new standard meter are designed for a maximum of 4,000 pounds working pressure and the meter is adaptable for all types of service. The differential ranges may be easily converted to 20-inch, 50-inch and 100-inch ranges. Static ranges are also available from 0 to 4,000 pounds. Important internal working parts of the meter are made of stainless steel.

Emco McGaughy Integrator

New Pension Plan Adopted by Shell

S. Belither, president of Shell Oil Co., has announced the adoption of a Retirement Pension Plan, the provisions of which will extend to all of the 27,500 Shell employes in the United States and Canada.

The plan which is desired to round out a broad program of social benefits already in force will date back to January 1, 1938. The form of the plan was determined after a careful study of the factors involved in providing old age security and is different in several respects from other pension plans.

The Shell pensions will be provided by the company without contribution by employes. Normal retirement ages are defined as 60 years for men and 55 years for women, but retirement at these ages is not compulsory. Generally, the pension is 40% of the salary at the time of the employe's retirement and this plan does not replace the company's Provident Fund.

A woman researcher has discovered a way to measure oil films so thin that 35,000 of them piled atop each other would be no thicker than a sheet of newspaper.

Dubbs Scores in Patent Suit

Universal Oil Products Co. won the first round in a battle with Globe Oil & Refining Co. in Federal district court in Chicago recently.

Judge William H. Holly denied a motion of Globe to dismiss a suit brought by Universal, charging Globe with infringement of two of Universal's patents by operating so-called Winkler-Koch cracking units in its refinery at Lemont, Illinois, dismissal was asked on the ground that Universal was in court with "unclean hands".

The patents involved are No. 1,392,629, issued to Carbon P. Dubbs, and known as the clean circulation patent, and No. 1,537,593 issued to Gustav Egloff and known as the 2-coil selective cracking patent.

Universal refuted the charge that it came into court with "unclean hands" and hence was entitled to maintain its action.

Globe's accusation of "unclean hands" included charges that Universal had used unethical methods in investigating proceses and obtaining information in Texas years ago, and that it had improperly hired Otto Behimer away from the Texas Company. Mr. Behimer was a witness in this hearing.

Otto Wannack, formerly employed as an investigator by Universal under the direction of Carbon P. Dubbs, was brought from Germany by the defendant to testify to unethical activities. Mr. Dubbs was also a witness for Universal, as was H. J. Halle, president of the company, both of whom denied Globe's accusations.

In deciding the case, Judge Holly, among other things, said:

"I have reached the conclusion that the evidence does not sustain the defense of unclean hands.

"First, as to Mr. Behimer: He was within his rights in leaving the employ of the Texas Company and accepting employment with the Universal; and Universal was within its rights in employing him.

"I was impressed with Mr. Behimer's apparent honesty on the witness stand .... There is no evidence that Universal asked him or requested him or endeavored to get him to make a false statement.

" . . . I think from all the testimony in the case that if Mr. Behimer had been called upon to testify by Texas in the interference proceedings he would have testified to the truth."

Concerning the evidence, Judge Holly said:

"Mr. Wannack and all of the others who testified on behalf of Globe did testify that Universal requested nothing but the truth."

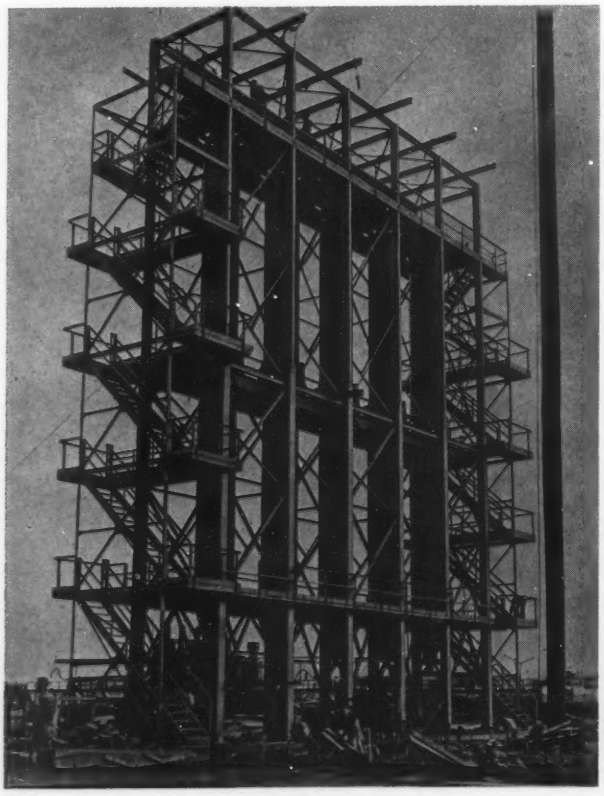
Judge Holly concluded his decision with the following statement:

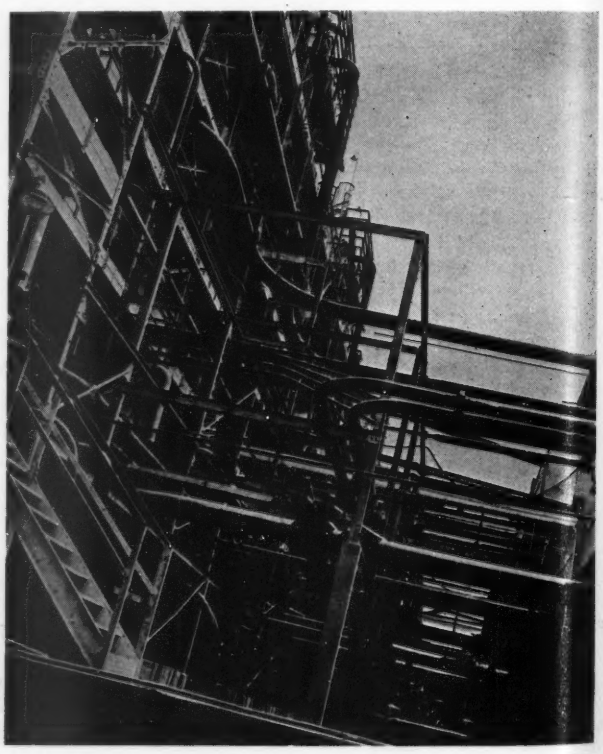
"And upon the whole evidence I feel that the defense of unclean hands has not been sustained."

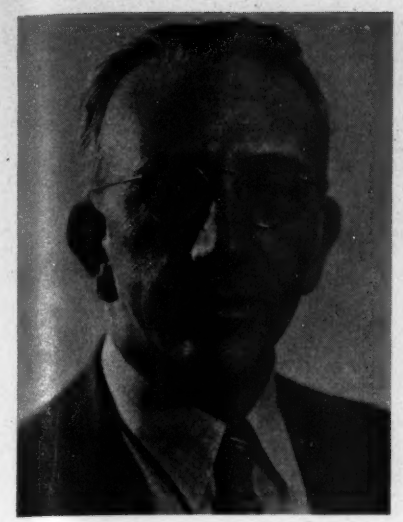
The two patents involved are the same two which were found valid and infringed in the suit of Universal versus Root Refining Company. The findings in favor of Universal in that case were sustained by the United States Circuit Court of Appeals and certiorari was denied by the United States Supreme Court.

Double taxation of the gasoline used by 20,000,000 American families and nearly 5,000,000 truck owners may end next year. That possibility is seen in the growing sentiment in Washington to permit the emergency federal excise taxes, inaugurated in 1932, to lapse on June 30, 1939, the end of the current fiscal year.

RICHFIELD OIL CORP.'S new five-million dollar plant expansion program at Watson is expected to be completed well before the end of the year. Backed by Richfield's great resources in engineering skill and capital, this completely modern refinery is certain to be one of the outstanding accomplishments in the industry. At left, below, is the first view to be published of the polymerization installation being completed at the new refinery. At the right is a somewhat modernistic view of the great maze of piping from the huge Deflorez furnaces to the bubble towers.







Fred Shumack

James McPhee

Two Major Promotions Lane-Wells Announces

Organization changes announced by W. T. Wells, president of the Lane-Wells Co., as of Aug. 1, 1938, include the following: Fred Shumack, formerly California sales manager for Lane-Wells and more recently actively identified with the organization of the electrolog division, has been named general manager of purchases. In this capacity Mr. Shumack will have control of company purchases, credits and collections in all areas in which they operate. His headquarters will be in Los Angeles.

James McPhee has been named California sales manager for the company and under his jurisdiction will come the sales and operation of the various Lane-Wells products and services including gun perforating, oil well surveying, directional drilling and electrical open hole logging.

Long Beach Harbor Board Agrees to Output Curtailment on Its Lands

Agreement of the Long Beach Harbor Board to permit operators on its lands to curtail production to 400 bbls. per well at Wilmington followed decision of the state to seek an injunction under the "gas waste" law against those operators.

Reports were that the operators in question were more than willing to curtail to the levels of production prevalent over the field, but that they found themselves up against a stone wall in the Harbor Commission, whose desire for plenty of production arose from its design to get enough gas to supplant its takings from the Industrial Fuel Co.

Under its contract with Industrial, the Harbor Commission is permitted to take only royalty gas, hence its desire to make that royalty gas production sufficient to cover all of its needs. At present, the Commission is taking all its royalty gas in kind, putting it into the distributing system, and selling it.

The Gas Conservation Act, under which it is unlawful for California operators to waste gas, has not been invoked for several years. Threats were made against Mountain View operators three or four years ago, but no action was taken.

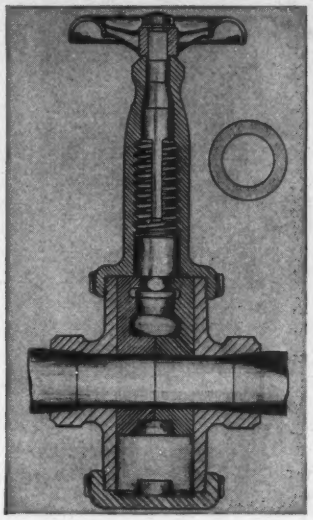
In the present case, it appears that operators on Harbor Commission lands are "in the middle" in a matter over which they have no control. Inasmuch as the Gas Conservation Act can be invoked against operators only, not royalty owners, the state action, when and if taken, will be directed against oil companies rather than the Harbor Commission, although it is the latter which appeared to be the root of the trouble at Wilmington.

However, if, as it seems, the operators are willing to curtail, they would probably make no attempts to prevent an injunction against them. The injunction, if and when granted, would force the Harbor Commission to permit its lessees to cut their production to a point which did not waste gas, and it may be that the method would make possible the degree of curtailment that has never been reached but that is considered necessary at Wilmington.

New Monat Valve

The Monat Valve and Forge Co., 996 Bessemer Bldg., Pittsburgh, Pa., has recently developed a packless, cylindrical gate valve, suitable for high as well as low pressures and temperatures.

This new, rugged valve, designated as the Monat "Stream-Flow", contains the



salient construction features of both gate and plug valves but none, the makers claim, of the disadvantages of either. There are no cavities and friction is eliminated. It is available in sizes ranging from ½" to 8" in the standard metals. Also in special metals and alloys for lines handling corrosive liquids and gases.

The body of this new valve carries a cylindrical bore, at right angles to the line of flow. A cylindrical gate is moved up and down by means of a screw in the valve bonnet, and is prevented from turning by a key in the cylindrical bore. The run of the valve conforms in shape and size to that of the pipe—namely that it is circular.

No packing is required. The only operating part in the line of flow is the gate itself. A cap on the bottom of the body and the removable bonnet permit cleaning the valve while it is in the line.

Monat valves are used for steam, oil, gasoline, varnish, food products, gases, air, etc. The manufacturer will be pleased to forward literature and prices upon request.

Cutting Torch Bulletin

Victor Equipment Co., 844 Folsom St., San Francisco, has just issued a new cutting torch bulletin which is much more extensive in coverage of cutting problems than the usual publication of this type. The bulletin contains information of considerable value to operators and should find a place in their libraries.

Sperry-Sun Promotes Roberts, Emerson

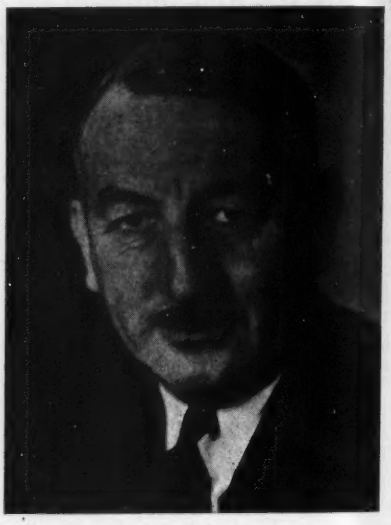
W. H. Emerson

Dwight C. Roberts

Dwight C. Roberts has been appointed Regional Manager of the Pacific Coast Region and will have supervision of all Sperry-Sun's activities in the West Coast area. Roberts' headquarters will be in Long Beach, G. L. Kothny, vice-president of Sperry-Sun Well Surveying Co. announces.

W. H. Emerson will continue his present duties as District Manager with headquarters at Long Beach, California, Mr. Kothny said.

Norval Myers, recently appointed manager of refineries for Union Oil Co.



J. N. Holden, recently appointed manager of Union Oil Co.'s Oleum Refinery.

Pump Development Told by Neilsen

Signal Hill operators in the year 1924 saw the world's deepest oil wells going on the pump. Up to that time oil tool manufacturers were not solving problems before they were presented, so the pump manufacturers especially found themselves in an embarrassing position.

Karl P. Neilsen, of Long Beach, who was closely associated with the developments of this era, in reminiscing on this period, says:

"The problem of efficiently pumping Signal Hill wells at that time was no one-man job. Like all problems that have faced the oil industry, it took cooperation between manufacturers and oil men. Suggestions, ideas and theories came in from all oil companies to all manufacturers. It was up to the manufacturer to accept and try that which appeared workable. Everyone kept his eyes and ears open.

"Metallurgical improvements were up to the manufacturer, who in turn sought help from the steel mills and iron foundries. Refinements in design were up to the manufacturer, as they are today.

"Testing was all done in wells. There were no laboratories, and very little engineering. In spite of this, most of the basic conclusions arrived at by the trial and error method remain unchanged. However, they are now more generally and better understood.

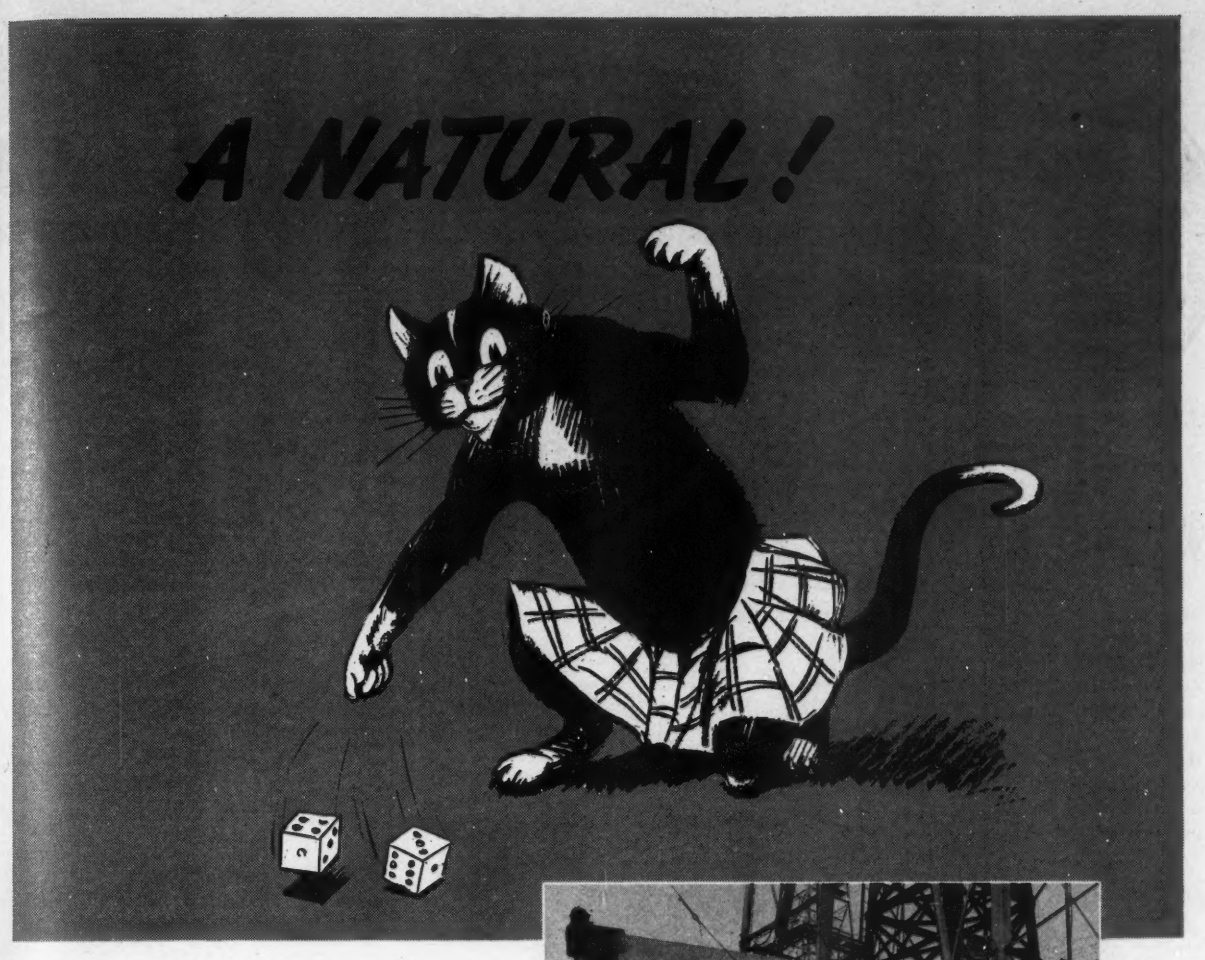
"The first development that led the way to a more efficient pumping of these deep wells was the insert cup pump of 1½-inch and 1 15/16-inch bore. The wells were clean, and the bore right, so it soon replaced nearly all the old tubing pumps.

"Later, sand complicated the problem, so the 'Insert Metal Pump,' referred to as the 'Traveling Tube' or 'Upside Down Pump,' came on as the answer. It consisted of a cold drawn tube traveling over a hard iron plunger. It replaced the cup pump in the tough well. Being of 'Barrel Traveling' design, and well adapted to handle sand, this pump, in an improved form, is still in quite general use.

"Next to appear was the 'Plunger Traveling' Insert Section Liner Pump, which was the natural result of a decline in wells and an increase in percentages of corrosive waters. Its advantages consisted mainly in its wide range of possible metallurgical combinations for wearing surfaces. It allowed for iron or steel liners, and a steel or chromium plated plunger. Later, this pump came into use in the 'Barrel Traveling' design.

"The depth of Signal Hill wells, as well as the presence of a high ratio of gas in the oil sand, made gas separation a serious problem. Pump efficiencies varied to a great extent. It was not uncommon to get an increase of two hundred barrels per day from running a gas and oil separator, and, needless to say, many were run where no benefits were received.

"Today, with the use of the polish rod dynograph, depthograph, and the measurement of gas coming through the tubing, gas and oil separators are no longer run on the suspicion they will increase production. Modern well studies have eliminated the hit or miss methods of that era, especially in the field of gas and oil separation.



Installation at Willow St. east of Cherry St., Signal Hill. Reduction gear unit driven by 15 horsepower motor. In constant service since September, 1933.

Electric motors for oil-well pumping are "naturals". They have everything a prime mover needs—steady, quiet and dependable operation; a long productive life with little repair expense; low first cost and large salvage value; low operating cost; high efficiency; and ease of operation.

You'll be ahead by installing electric motors on all your wells. For complete information about the costs and advantages of electric pumping, just call your Edison office and ask a power engineer to call. No obligation.

SOUTHERN CALIFORNIA EDISON COMPANY LTD.

ELECTRICITY *at work in the oil fields*

Field Development

Los Angeles Basin

South Rosecrans Well Flows 1000

Completing the largest well in the southernmost portion of the Rosecrans field, Superior Oil Co. obtained a 1030 bbl. flow from its Maxwell Comm. No. 9. The oil, which is 31.6 gravity and clean, is from the 105 ft. of formation open to bottom at 7658 ft. Indicating that the well's potential is even higher, a 36/64 in. bean is used maintaining a flow pressure of 350 lbs. and a casing pressure of 750 lbs.

Two wells were completed by Union Oil Co. on its Rosecrans lease. Well No. 21, which was bottomed at 7845 ft., is now on settled production for 306 bbls. of 31 gravity oil cutting 15%, while No. 22, from 7915 ft. is flowing 818 bbls. of clean oil. The former well employs a 14/64 in. bean and the latter a 27/64 in.

Barnsdall Oil Co. completed Trust No. 5 at 7802 ft. flowing 1500 bbls. after cementing 8⅝ in. casing at 7239 ft. The company's last producer, Rosecrans No. 9, is flowing 585 bbls. of 33 gravity oil with a water content of 4%. Barnsdall is drilling Higgins No. 4 for Exeter Oil Co. at a depth below 4000 ft.

Recent completions by Universal Consolidated Oil Co. and Barnsdall Oil Co. having proved its Trust lease for deeper production, Republic Petroleum Co. is rigging up to deepen well No. 4.

Bankline Oil Co., a newcomer to the field, is spudding its first well on the Kirby lease.

Long Beach Deep Test Below 6800

De Soto Oil Co.'s important deep test of the Lovelady area of the Long Beach field is now drilling below 6818 ft. The well will be carried below present producing horizons in search of new sands.

Tide Water Wildcat Gets Oil Showing

After picking up a second oil sand in its San Fernando wildcat, Porter No. 1, Tide Water Associated Oil Co. is rumored to be preparing to set casing to test showings encountered immediately above present bottom of 3745 ft. Several hundred feet of poorly saturated sands were cored below 1700 ft., but failed to yield production. The well is located in sec. 27,3-16.

A. V. Oil & Gas Tests at Newport

After coring hard brown shale showing oil below 1900 ft., A. V. Oil & Gas Co. made a formation test from 4585 ft. to bottom at 4634 ft. but recovered practically no fluid. The well is located on the Mesa back of Newport.

Fourth Newhall Well For Barnsdall

With its Rancho San Francisco No. 3 now on settled production at 550 bbls. of 35 gravity clean oil through a 12/64 in. bean and under 1325 lbs. flow pressure, Barnsdall Oil Co. is planning to drill No. 4. The new well will be located 650 ft. east of the discovery well, No. 1, and an equal distance north of the latest completion No. 3. The latter is the banner well for the new field, having been drilled in far less time than either of its predecessors, and having penetrated more than 1000 ft. of oil bearing formations to bottom at 7264 ft. It was finished with a much greater potential yield.

H R K Oil Renews Five Points Interest

Renewing interest in the Five Points area in the northeast part of Huntington Beach, HRK Oil Co. is starting a new test located 700 ft. south and 1500 ft. west of the intersection of Talbert Road and Huntington Beach Blvd. Backing the company are E. C. (Gene) Reid and W. B. Harrell, both of the Termo Co.

In the Townlot field, J. W. Weaver is reconditioning the old Texas Co. Brockman well and Mar Rico Oil Co. is completing Eloyd No. 1 at 5690 ft.

Channel Development Planned at Wilmington

Early development of 92 acres of proven oil lands lying beneath the ship channels and turning basins of the Long Beach inner harbor is indicated by the signing of a lease on these properties by the Signal Oil & Gas Co. The lessor is the Long Beach Dock & Terminal Co. and negotiations are now in progress by which surface drill sites will be obtained from the city of Long Beach which will also participate in royalties. A proposal received by the City Council from Westgate-Greenland Oil Co. to develop channels No. 2 and No. 3 and the large turning basin, appears to have a similar legal status as the D. D. Dunlap Oil Co. lease which was held up with an injunction.

The finding of apparently productive lower Terminal sands in Allied Petroleum Co.'s well No. 22, situated at the intersection of Seaside Blvd. and Ontario Ave., augers well for large production in this area which previously had been considered as productive only in the Ranger zone. The oil sand was entered at 3560 ft. and extends to bottom at 4000 ft. where a production test will be made.

Two harbor wells were finished by Hancock Oil Co., No. B-12 flowing 2500 bbls. from the Terminal zones and No. C-25 yielding 400 bbls. of Ranger oil. The wells are 4048 ft. and 3020 ft. deep respectively.

Somewhat of a disappointment in the Ford zone, Crail Bros., McAllister No.

PROGRESS....

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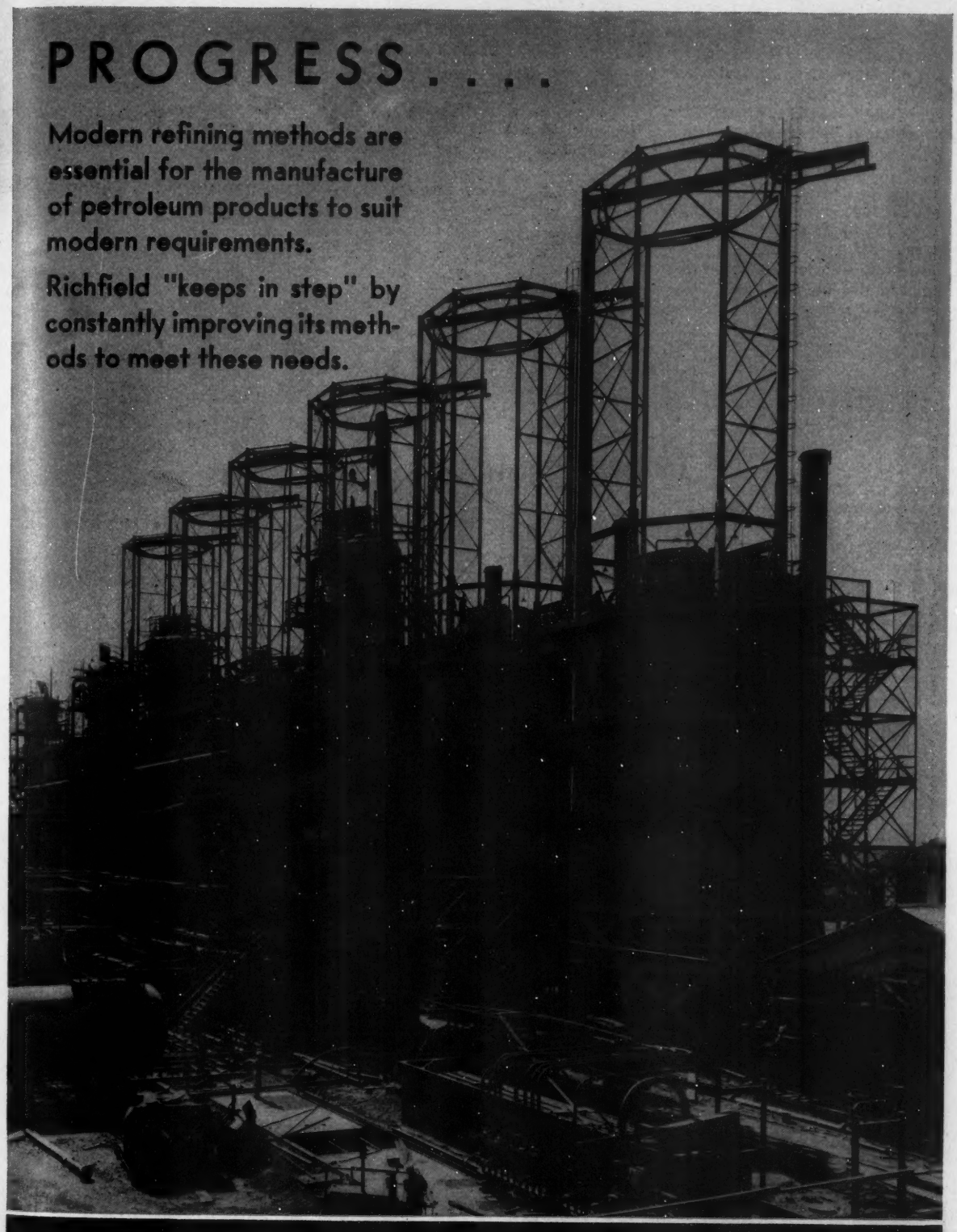


RICHFIELD

1, at Pioneer and "F" streets in Wilmington, pumps only 125 bbls. daily with perforations open from 5200 to 5540 ft. The oil, however, is 29 gravity and clean.

Tide Water Associated's northerly Wilmington test, Banning No. 1, found the schist barren and plugged bottom from 6761 ft. to 3485 ft. where the well is now pumping 225 bbls. of 16.7 gravity oil from the Ranger zone. This significant deep test is located at State St. and Banning Blvd.

V. R. G. Wilbur completed his Santa Fe No. 3 at the intersection of Denni and McFarland as a small Ranger zone pumper.

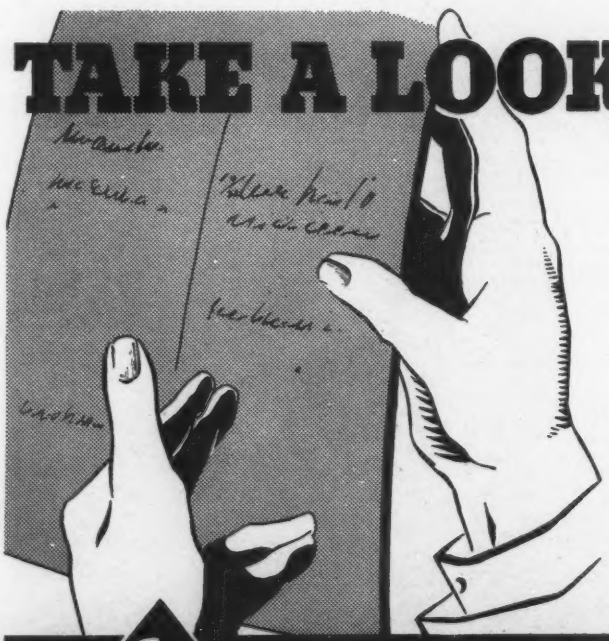
Investigation reveals that the tragic collapse of a steel rig was no fault of the derrick, but due to a foundation failure caused by an unusual directional strain.

During a single week Richfield Oil Corp. completed four wells on the Pacific Dock and Terminal property, the largest being No. 4, which, open in the Terminal zones, flowed initially at the rate of 5280 bbls. per day through a one inch bean. Indicating that the greater portion of the flow was from the upper Terminal horizon, the gravity was only 22 degrees. The hole was bottomed at 4240 ft. and the oil string contained perforations at intervals below 3097 ft. and was cemented through perforations at 3232 ft., 3492 ft. and 4105 ft.

Pacific Dock No. 1, bottomed at 4385 ft., came in with the second largest yield, 2042 bbls. This well produces the Ranger as well as the Terminal zones, the top perforations being at 2597 ft. Well No. 7, which plugged off barren formations from 4235 ft. to 4127 ft., flowed 1265 bbls. from the two lower zones, while No. 8, finished at 3620 ft., was the smallest at 700 bbls. All four were clean.

LOS ANGELES BASIN WILDCATS

Area	Well	No.	Section	Depth	Status
Bellflower	Clayton, Geo. L., Scott	1	32, 3-12	6897	Idle
Castaic	Royal Land Corp.	1	8, 4-17	1061	Drilling
	DHB Oil Co., Buena Park	1	34, 3-11		Rigging up
La Mirada	John McKeon & Assoc. Carmenita	1	21, 3-11	7550	Drilling
Newhall	National Pet. Corp.	1	27, 4-16	2775	Idle
	Palmluck Oil Co.	1	23, 3-16		Rig
Palmdale	Antelope Valley Pet.	1	17, 6-12	50	Idle
Palos Verdes	Gene McLaren	1	27, 4-14	3992	Idle
	Rolling Hills Pet.	1	27, 4-14	5088	Fishing
Pico	British Am. O. P. Co.	1	12, 3-12	4568	Idle
San Fernando	Tidewater Assoc., Porter	1	27, 3-16	3745	Testing
San Pedro	Grady, R. T.	1	23, 5-14		Foundation
Whittier	Langstaff, Geo. W., Iliff	1	8, 2-11	1850	Drilling
	San Bernardino				
Chino	So. Counties Pet. & Drlg. Co.	1	26, 2-8	520	Drilling
	Orange County				
Costa Mesa	A. V. Oil & Gas Co.	1	16, 6-10	4634	Testing
Kraemer	Congress Oil Co., Kraemer	1	36, 3-9	3017	Pumping 100b/d
	San Diego County				
Carlsbad	Dauphin Dev. Co.	1	16, 12-4		Rigging up



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Richfield's latest completion was Pacific Dock No. 9 from a depth of 3636 ft. The initial production rate of over 3000 bbls. has been beaned back to 500 bbls.

Union Pacific Railroad Co. finished three wells on the connecting channel east of Ford Blvd. Well No. 85, open at intervals from 2923 ft. to bottom at 3997 ft., came in flowing 1210 bbls. of 25 gravity clean oil and No. 87, with perforations open between 2860 ft. and 3955 ft., gauged 1390 bbls. No. 89 flowed 500 bbls. from the Ranger zone.

Also completed by the Railroad Co. was Pacific Dock No. 3 which was plugged from 4110 ft. to 3786 ft. Initial production was at a rate of 510 bbls. a day, 28 gravity and clean.

Universal Consolidated Oil Co. obtained another excellent producer in Newport No. 1, bottomed at 4100 ft. With production segregated, the upper Terminal zone flowed at a 2500 bbl. rate while the lower sand gauged 510 bbls. Universal is planning five more wells for the Newport leases which are located on West Seventh St. in the Long Beach harbor sector.

Gasoline prices stand 28% below the general price level, reports the American Petroleum Industries Committee.

Three New Producers in West Montebello

Three wells were placed on production recently in the West Montebello deep zones with Union Oil Co. obtaining the largest flow in Paul Howard No. 2 from the Fifth zone. With 77 ft. of formation open to bottom at 5489 ft., the well flowed initially at the rate of 65 bbls. on hour through a 56/64 in. orifice. Now beaned back to 18/64, production is 267 bbls. of 33.8 gravity oil cutting 12% and 300,000 cu. ft. of gas.

McVicar & Rood brought in their second well in the field, Manz No. 2, with an initial production of 750 bbls. cutting 3.0%. The well was finished at 6259 with 56 ft. of the Sixth zone open. Standard Oil Co. completed McDonald No. 1 in the same zone at 6245 ft. with first gauges showing a 580 bbl. production rate. Water string was set at 6173 ft.

V-8 Oil Co. is completing Estelle No. 1 at 6275 ft. after obtaining a water shut off OK on 8⅝ in. casing set at 6223 ft.

On the Monterey lease, St. Helens Petroleum Co. has well No. 28 flowing 390 bbls. cutting 9.0% on formation test of the fifth zone. The interval open is from 5407 to 5600 ft. and the flow is restricted by a 16/64 in. bean. Monterey No. 29 is drilling below 3000 ft. Eggleston No. 2, bottomed at 5710 ft. is undergoing a series of tests to determine the productive possibilities of the Fifth zone.

Brookline Oil Co. has been unable to maintain steady production from Drake Community No. 1, bottomed at 6444 ft., and the well appears to mark productive limits to the south.

Adding another unit to their group of operating companies, O. J. Rohde, Harry Hunter and C. A. Doody recently formed the Montebello Reservoir Oil Co. The new organization has taken over the Fairfield project on the reservoir site near the intersection of Lincoln and Maple Avenues, one of the best located in the area. Present depth of the well is 2475 ft. in hard formation. West Montebello Oil Co. No. 1, first of the group to be spudded, is preparing to complete in the Sixth zone after cementing 7 in. casing at 6197 ft. Montebello Wesco, Inc. is drilling below 4220 ft.

Three new wells are being started by Standard Oil Co. and one each by St. Helens and Union.

Taxes on gasoline have increased from an average of $4.37 per motor vehicle in 1923 to $35.37 in 1937.

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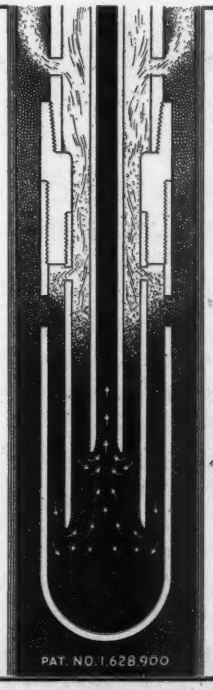

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Basin Oil to Drill Second Potrero Well

Following the completion of its Country Club No. 1 last spring for nearly 600 bbls. of high gravity oil, Basin Oil Co. is preparing to drill a second well south and east of the intersection of Manchester and Prairie Boulevards. The company is headed by C. G. Willis and the engineering is done by Robin Willis, both being also associated with the Hildon Oil Co. operating in the northwest extension of the Long Beach field.

New Company Plans Bellflower Test

Backed by local capital from Downey and Bellflower, Harbor Oil & Refining Co. has been organized for the express purpose of drilling a test well in the flat country lying between the towns of Bellflower and Artesia. According to H. J. Keeley, secretary of the company, operations will start within two weeks on a block of leases totalling more than 1200 acres. Geo. L. Clayton, whose Hynes wildcat is now standing idle, is expected to act as field superintendent.

NO MATTER how carefully they are made and how good the materials used in them may be, close-fitted pumps can't stand up in service where sand conditions prevail. Pumps fill up, plungers freeze, close-fitted parts are scored and worn beyond repair. Frequent pulling jobs and maintenance expense eat heavily into profits. *The moral is*: YOU CAN'T *FIGHT* SAND.

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New Refinery For Torrance Field

Crown Oil & Refining Co., headed by E. E. Pevepo, has started building an oil cleaning and topping plant on Carson Ave. in the Torrance field. The new refinery has been specially designed by Mr. Pevepo to handle the types of crude produced both in old Main zone and in the new Deep sand found in the Pennsylvania Ave. sector and in the D & B extension area.

Dauphin Dev. Drills Near Carlsbad

Dauphin Development Co., which for the past year has been prospecting for oil on the Waltham Anticline in Fresno county, has moved in equipment and is starting a well in San Diego county near the town of Carlsbad.

Torrance Development Receives Serious Set Back

The first serious set back in the sensational career of the present Torrance boom was received during the past week when Young & Bryan's outpost well, located on 237th St. east of Pennsylvania Ave., found the oil zone wet and was abandoned at 5025 ft. At the same time, J. L. O'Donnell's No. 42, a block to the north, found intermediary water sands which necessitated the cementing of a blank section in the liner. With perforations open from 4836 to 4917 ft. and 4957 to 4988 ft. the well refused to flow and is now pumping approximately 150 bbls. a day to the sump. First cuts of 30% appear to be cleaning up.

More cold water was thrown on hopes for further southward extension by failure of Blue Bell Petroleum Co. to pick up oil sands in its semi-wildcat test on 241st St. east of Pennsylvania Ave. An electric log indicated the well to be structurally low and the well is being cored ahead on the theory that a fault exists between this location and the "Hot Spot." Last reported depth was 5090 ft.

Oglesby & Allison, Inc., deepening an old Southern California Drilling Co. well at 236th and Narbonne, found encouraging stringers but no oil sand body to 4955 ft. where operations were halted to repair equipment.

Coast Line Oil Co., Barto No. 2, which failed to obtain commercial production between 4955 and 4995 ft., perforated the water string from 4850 to 4900 ft. and recompleted with an initial flow estimated at 100 bbls.

Completions since those reported in our first August issue number eighteen with by far the most satisfactory initial

rates registered by wells in the vicinity of 233rd and 235th Sts. west of Pennsylvania Ave. where it is now known that the structural axis exists. A new high was established when Silver Strand Oil Co. finished No. 1 with a flow gauged at 1270 bbls. This well is located on the sub-surface high 700 ft. west of Pennsylvania Ave. on the south side of 233rd St. and was brought in with 220 ft. open to bottom at 4985 ft.

Wells in the 500 bbl. class were brought in by W. P. Andrews, Morton & Elder, Packard Petroleum Co., Cal-Oak Oil Co. and Wilton Oil Co. Production of from 100 to 300 bbls. was obtained by Imperial Gypsum & Oil Co., W. E. McCaslin, Henry Wertella, Calridge Oil Co., Kiessau & Ford, Woolner Oil Co., Peters Royalty Co. and Texas Co.

Several projects are attempting to extend production east of Narbonne among which are Star Petroleum Co.'s Patton No. 1, now drilling below 4450 ft. and Sunny State Oil Co. well No. 1 which is just spudding in. East of Eshelman, Sol Oil Co. is preparing to pump after plugging bottom from 5230 ft. to 5144 ft. Thirty-eight feet of formation will be tested.

Many wells are now in the process of completion in the "Hot Spot" but the number of new locations is rapidly declining and several projects have been suspended in the southern portion of the area. Due to overdrilling, all wells are showing a sharp decline and it now appears that the hey-day of the boom is definitely over unless the picture is changed by the finding of production in one of the key outposts wells now drilling.

Three Wells Will Soon Test D & B Zone

Coincident with the first signs of decline in the Torrance "Hot Spot" come the first proofs of whether or not the new southeast extension, known as the "D & B Area", will be a real field. At present writing three wells have entered the so-called Del Amo zone and a fourth and fifth are coring for its top. At the intersection of Armand and Frampton Aves., California Star Oil Co., O'Brien No. 1 bottomed in shale streaked with gray sand at 5325 ft., plugged to 5290 ft. cemented casing at 5120 ft. preparatory to making a production test. The company's second well, Lermans No. 1 topped the zone at 5140 ft. and is still making hole. Isco Oil Co., Extension No. 1, located at 253rd and Marigold, entered the zone at approximately 5140 ft., and with bottom at 5313 ft. is preparing to run casing. Bush Oil Co., Giminez No. 1 and General Petroleum Corp., Poggi No. 9, are now coring at the 5000 ft. level.

Two wells have been recently spudded; D & B Oil Co., Dawn No. 2 and Silverado Oil Co. No. 1, neither being yet below 1500 ft. in depth.

Near the corner of Lomita Blvd. and Normandie, J. L. O'Donnell is preparing to spud, as is The Texas Co. on its large Oakley lease to the east.

The payroll index figure for refining in March was 136.0, a decrease of .8 per cent from February, 1938 and an increase of 8.3 per cent over March, 1937.

Bishop Oil Co. Announces Promotions

W. I. Cunningham has been made geologist in charge of the Bishop Oil Company's California geological and land department with headquarters at Room 307, Professional Building, Bakersfield, California. Mr. Cunningham has been scout and geologist for the company in the Mid-Continent for a number of years.

Mr. Carl Todd has been appointed as assistant geologist of Bishop Oil Co. with headquarters at Bakersfield, California.

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San Joaquin Valley

Wasco Interest Lags Pending Developments

Pending the arrival of another well in the oil sand, interest of San Joaquin Valley oil men has temporarily been diverted from Wasco, California's record depth field. Deepest of the wells now active is Continental Oil Co.'s Seaboard-Associated, KCL C-1, outpost and virtual wildcat in sec. 27, 27-24 which is endeavoring to recover or sidetrack a drill-collar and bit lost on bottom at 12,778 ft. The drill is generally supposed to have entered the Rio Bravo zone shortly before the fish was lost but the company has been noncommital as to oil showings.

Near the discovery well in sec. 8, 27-24, Continental's KCL No. A-3 is nearing 12,000 ft., while in section 7 Standard is drilling Mushrush No. 1 below 10,500 ft. and in section 17, KCL No. 8-B-1 at 11,750 ft.

Routine Work Rule in Valley Fields

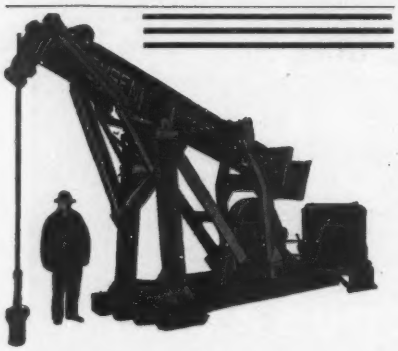
With the attention of most independent operators focused on the boom fields in the Los Angeles basin, activity in Valley proved fields has largely fallen in the rut of routine development.

A small flurry was caused at Mountain View recently by the recompletion of several old wells for better than average yields, but it is doubtful if any large scale development will result.

A few work-over jobs and the completion of new wells by Pacific Oil & Gas Development Co. and Western Gulf Oil Co., together with the drilling of a new well by Meridian Oil Co., constitute the activity at Fruitvale.

Shell, Standard, and Ohio Oil Cos. each have one string of tools running in the Canal field, Standard drilling on its fee owned Rio Bravo pipeline booster station site.

Belridge Oil Co., as usual, leads in activity in the field for which it is named



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SAN JOAQUIN VALLEY WILDCATS

Area	Well	No.	Section	Depth	Status
Fresno County					
E. Coalinga	Pure Oil Co., SPL	1	31, 18-17	11818	Drilling
Clovis	Central Valley Oil Co.	1	1, 12-20	588	Idle
Jacalitos Hills	Jacalitos Pet. Co.	1	14, 21-15	6925	Drilling
	Dauphin Dev., Ragan	1	30, 21-14	325	Drilling
Panoche Hills	Panoche Hills Oil Co.	3	12, 14-11	300	Idle
Kern County					
Belridge	Abbott, F. E.	1	18, 27-19		Rig
	Shell Oil Co., Voight	4–13	2, 27-20	910	Abandoned
Buena Vista	Ohio Oil Co., KCL	A-8	32, 31-26	11186	Testing
		F-1	10, 31-25	3750	Drilling
Buttonwillow	Calif. Lands, Inc., Salisbury	1	7, 29-24		Foundation
Devils Den	Gibson Oil Co., Alferitz	3	14, 25-18	950	Drilling
	Goodrum, Geo., Baron	1	24, 25-18	1210	Idle
Edison	Johnson, G. W.	B-P 1	33, 29-30	1162	Drilling
Elk Hills	Richfield Oil Corp.	KCL-W 1	32, 30-25	6515	Drilling
Fruitvale	The Texas Co., C.W.L.	1	7, 29-27	8728	Drilling
	Continental Oil Co.	B-2	12, 29-26	8250	Drilling
Grapevine	Hall-Baker Co., Reserve	33–2	33, 11-19	4615	Testing
	Petrol Corp., Reserve	5	33, 11-19	4607	Idle
	Richfield Oil Corp.	KCL-1	28, 11-20	5879	Drilling
Kern River	Amerada Pet. Co., Olcese	1	4, 29-29	3400	Abandoned
Lerdo	Standard Oil Co.	KCL 18-1	29, 28-26	10499	Abandoned
McFarland	Tidewater Assoc. Oil Co.,Pond	1	17, 26-25	9190	Abandoned
	Shell Oil Co., KCL	83–35	35, 26-25	10061	Abandoned
Mt. Poso	Federal Drilling Co., Glide	3	13, 26-27	2200	Drilling
	Marcan Oil Co., Glide	5	1, 27-27	2820	Abandoned
	Trico Oil & Gas Co., Willard	1	17, 26-28		Grading
	W. P. W. Pet. Co.	5	14, 27-28		Location
Poso Creek	Reynolds Oil Co.	1	20, 27-27	2855	Idle
	Harkness & Laws, Hunt	1	28, 27-27		Foundation
Richgrove	Dilamar Oil Corp., Quinn	1	15, 25-27	2956	Pumping
		3	15, 25-27		Rig
San Emigdio	Shell Oil Co.	KCL 4-26	26, 11-22	10347	Drilling
Strand	Continental Oil Co.	E-1	17, 30-26	8575	Idle
Union Ave.	Richfield O. Corp.,Union Ave.	1	6, 30-28	4404	Drilling
Kings County					
Alpaugh	Tri Counties Oil Co., Olson	1	10, 23-22	7769	Idle
Dudley Ridge	Falcon Oil & Gas Co.	1	24, 23-20	6500	Idle
Pyramid Hills	Pyramid Prod. Co.,Retherford	1	27, 24-18	3090	Idle
Kettleman	Temblor Oil Co., Bunting	1	25, 23-18	9138	Plug 7815—Idle
Tulare Lake	Irvine, Athalie	1	11, 24-20	1865	Drilling
Tulare County					
Alpaugh	Sullivan & Youngdahl	1	33, 23-23	2732	Idle
Ducor	Nelson & Davison	1	1, 24-27	1267	Drilling
Trico	Caminol Co., A. O. G.	3	29, 24-24	7656	Drilling

by drilling three new holes and reconditioning another. Richfield Oil Corp. and The Texas Co. each have one string busy while Tide Water Associated is drilling one well and rigging to spud another.

Standard Oil Co.'s Greeley activity is now confined to sec. 20, 29-26 where derrick is being erected for Elrich Comm. No. 1 and Fleishauer Comm. No. 2 is deepening to the Rio Bravo sand. KCL No. 11-15 was brought in from the upper zone flowing 680 bbls. of 33 gravity oil and 1,800,000 cu. ft. of gas. Superior Oil Co. has re-entered its Krause No. 1, easterly edge well in the northwest corner of sec. 21, 29-26, and is deepening to the lower zone.

At the north tip of Lost Hills, both Randon Petroleum Corp. and Argo Petroleum Corp. have had difficulty in maintaining steady production, but each company's well has, at times, indicated potentialities above the average. Immediatéely to the west of the field, California Lands, Inc. is drilling Occidental No. 1, now below 2700 ft.

Less than normal is the amount of work now being done in the Midway-Sunset-Maricopa district, with only four wells actively drilling. Signal Oil & Gas Co. recently completed Kendon No. 5 for 130 bbls.

In the Kern Front field, California Star and Kern Oil Cos. are each working on one well. Barnhart-Morrow Consolidated finished No. 5 in sec. 11, 28-27 pumping 65 bbls. of wet oil from 1735 ft.

Kettleman Hills is yet the leader in number of strings running, there being now eleven wells drilling beside several preparing to start. In point of production this field is second only to Wilmington, which with 95,000 bbls. daily, leads by 30,000 bbls.

Rio Bravo, only competitively drilled deep valley floor field, was recently the scene of three large completions, General Petroleum Corp. and Geo. F. Getty, Inc. each bringing in their second producer while Superior Oil Co. finished its ninth. Typical of the three was the Getty well, Ramsey No. B-2, which on a potential test flowed at the rate of 6960 bbls. a day. Superior Oil Co. also returned Anderson No. 1 to production after cementing a blank liner on bottom and perforating by the gun method. The company's Helbling No. 1, sec. 1, 29-25 is now below 14,000 ft. making it the deepest active well in the state.

Shell Oil Co., which apparently has a corner on Ten Sections, is completing KCL No. B-2 in sec. 32, 30-36 and is drilling three other wells, all approaching final depths. Derrick is up for another project in sec. 20.

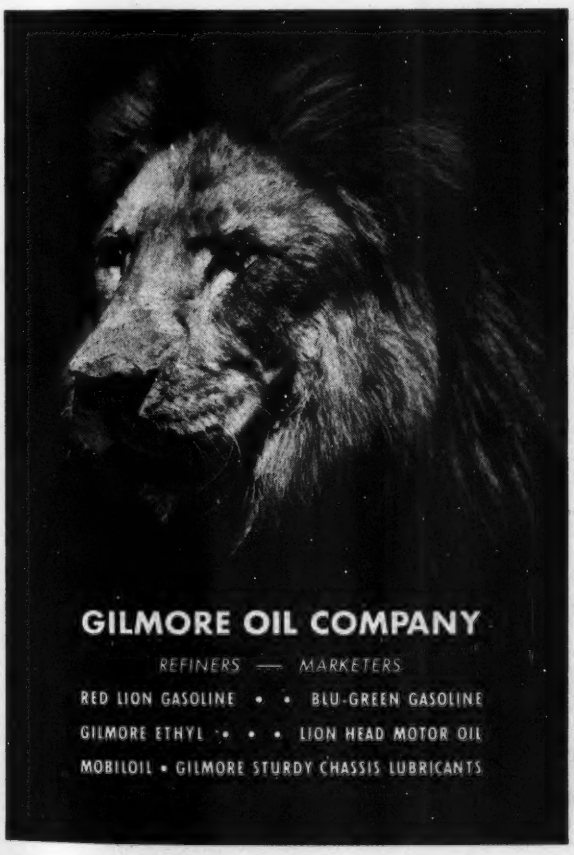
Honolulu Oil Corp., developing its proved Round Mountain holdings, recently contributed two good completions in that field, while Crestmont Oil Co. (Hillman & Long) finished Staley No. 4 in sec. 8, 28-29 for 175 bbls.

With the Torrance boom unmistakably on the wane in the Los Angeles basin, it is to be expected that in the early fall much capital and equipment will return to "unfinished business" in the valley.

Shell McFarland Test Abandoned in Basement

With basement rock at bottom, 10,061 ft., Shell Oil Co. has abandoned its KCL No. 83-35 in sec. 35,26-25, five miles south of McFarland. The well at no time showed commercial possibilities, the Rio Bravo at 8700 ft. and the Avenal at 9700 ft. both being entirely barren of oil.

Five miles west of McFarland, Tide Water Associated Oil Co. Pond No. 1 penetrated ten feet of the Rio Bravo zone before abandoning at 9190 ft. The well was located in sec. 17,26-25.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Wells Near Sand in Coalinga Hot Spot

Most important of all new productive areas in the state is the newly developed Coalinga Eocene Pool. With the discovery well now producing 290 bbls. a day of 33 gravity clean oil through an 8/64-in. orifice and ten new wells started, the new field justly deserves the acclaim it is receiving as ranking with Continental Oil Co.'s deep Wasco discovery in importance to the western industry. Although due to the structural peculiarities of the Coalinga Nose, it is dangerous to even hazard a guess, most geologists agree that the productive area will in all probability be large with exact limits remaining undefined for some time. Much information of value will be gained from two wells now being drilled on opposite flanks of the surface trace of Anticline Ridge, Medford Oil Co.'s Goetz No. 1 located in sec. 10,20-15 to the west and Superior Oil Co.'s Hight No. 1 in sec. 8,20-16, east of Petroleum Securities' producing well. Tentative correlations, based on the top of the Kreyenhagen Shale, place the Medford well approximately 300 ft. higher than the discovery well which is located in the northwest corner of sec. 18,20-16, while Superior's test is probably at least 800 ft. lower. Both wells are approaching critical depths, the former at 5684 ft. and the latter at 7335 ft. when last reported. Very little progress is expected to be made by present wells in determining lateral extent of the field as projects now under way tend to show width rather than length of what will probably prove to be a long and comparatively narrow structure following generally the trend of Anticline Ridge.

Second well to encounter the Gatchell sand should be that of Universal Consolidated Oil Co. in the southeast corner of the southwest quarter of sec. 12,20-15. After coring 17 ft. of apparently well saturated First Eocene zone sand below 6305 ft., a grayish, brown shale body was encountered in which the well was last reported as coring below 6612 ft. Unless the upper sand is found to be not correlative with that found by Petroleum Securities, the intermediary shale has thickened materially in the Leavitt-Hintze well. It is worthy of note that in the discovery well and in Petroleum Securities' second well, No. 88, the First sand was barren, but definitely contained oil and gas in Universal's Leavitt-Hintze No. 1.

Indicating that the Eocene rises to the northwest, Petroleum Securities Co. No. 88, one location up structure from Gatchell No. 1, topped the First sand at 6652 ft, a rise of 60 ft. If the intermediary shale does not thicken between these wells, the producing sand should be topped at approximately 6750 ft.

Two other wells are active in sec. 12, 20-15, Tide Water Associated Oil Co. drilling Guardian No. 66 below 4850 ft. and The Texas Co. Mohawk No. 19 making exhaustive tests of the Temblor zones before deepening below present bottom of 4424 ft.

In the northwest corner of sec. 13,20-15, Standard Oil Co., No. 82-13-C is drilling in hard brown shale below 4900 ft. while in sec. 7,20-16, Petroleum Securities Co. is drilling No. 7-7-F below 6100 ft.

Half a mile east of the north tip of the Coalinga East Side field, Tide Water Associated Oil Co. is spudding in an important outpost well located near the south quarter corner of sec. 1,19-15. Although company officials refuse to discuss the well, it is believed it will prospect for Eocene production, which if present, should be encountered at relatively shallow depth in this northern area.

Magnet Oil Co.'s Coalinga West Side deep test, Fearon No. 2 in sec. 18,20-15, has remedied crooked hole difficulties and is now drilling and coring below 3450 ft. Estimates place the top of the Eocene in this locality at 4250 ft.

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THESE figures are from the customer's own record and we believe them to be correct. The two wells were drilled concurrently in 1937, near Los Angeles: the two boiler batteries were the same size: and both outfits used water from the same source. The cost of the Nalco treatment amounted to less than a dollar per boiler per day. ASK FOR FULL PARTICULARS.

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Amerada Pete Quits Olcese Test Well

Amerada Petroleum Corp. has abandoned its Olcese No. 1, located south of Round Mountain in sec. 4,29-29, at a depth of 3400 ft. in pebbly granitic sand. The barren Vedder zone was encountered at 2730 ft. and the Walker formation was entered at 2850 ft.

Marcan Oil Drops Mt. Poso Wildcat

After finding the Vedder sand barren at 2810 ft., Marcan Oil Co. abandoned its west Mount Poso test well, Glide No. 5, at 2820 ft. During the years 1927 and 1928 Shell Oil Co. drilled four unsuccessful wells on the property which is in sec. 1,27-27.

California Lands, Inc. Starts at Buttonwillow

A valley floor test of more than usual interest is being started by California Lands, Inc., subsidiary of Bank of America, in sec. 7,29-24, eight miles southeast of the Buttonwillow gas field. Several wells have been drilled near the site of the new test, none however going below 6700 ft. The well will be known as Salisbury No. 1.

Small Encouragement in Valley Wildcats

Very little of an encouraging nature has been reported from the wildcat wells now drilling in the San Joaquin valley floor. Particularly disappointing were the results of two Standard Oil Co. wells which were abandoned with drill pipe in the holes. KCL No. 18-1, located in sec. 29,28-26, ten miles northwest of Fruitvale, was given up at 10,499 ft. after finding the Rio Bravo zone barren at 10,185 ft. The company's second Canfield Ranch well, KCL 15-2, was dropped at 8522 ft. after the Stevens zone was proved unproductive.

Immediately to the northwest of Fruitvale, Texas Co.'s Camp-West-Lowe No. 1, sec. 7,29-27, cored only gray sand in the Rio Bravo zone at 8495 ft. and may soon be on the abandoned list. Continental Oil Co., KCL B-2, sec. 12,29-26 has reported no showings to present depth of 8350 ft.

A mile east of the Elk Hills field, Richfield Oil Corp.'s sec. 32,30-25 test well is approaching 7000 ft. in depth without having encountered oil sands. The company's other interesting wildcat, Union Ave. No. 1 in sec. 6,30-28 south of Bakersfield, is testing the 4450 ft. showings which were first discovered by the predecessor of the present Western Gulf Oil Co. in 1927. Results so far indicate that the well will have to be carried deeper if productive sands are to be found.

In the San Emigdio area, Shell Oil Co. is drilling ahead below 10,375 ft. in its No. 1-A-4 in sec. 21,11-22. Formation data is very closely guarded on this well but rumors of oil showings have been entirely lacking.

Richfield Oil Corp. KCL No. 1, Wheeler Ridge edge well in sec. 28,11-20, is making slow progress at 5900 ft., being bothered by bit cones lost in the hole.

Hall-Baker Co., periodically active in the Grapevine area, is conducting a series of tests in the Reserve Oil & Gas Co. No. 2 in sec. 33,11-19. The 4615 ft. hole has been plugged to 4500 ft. and the well is being swabbed. The Petrol Corp. is planning to resume work on its Reserve-Petrol No. 33-5 in the same section.

Ohio Oil Co. is testing KCL No. A-8 in the Buena Vista gas field and is drilling a wildcat, KCL No. F-1, in sec. 10,31-25.

Two New Tests For Mt. Poso

Mount Poso, where excellent production is developed from relatively shallow wells at small cost, is always a popular field for exploratory work. At present Trico Oil & Gas Co. is preparing to drill Villard No. 1 in sec. 17,26-28, two miles north of production, and W.P.W. Petroleum Co. is planning to drill a fifth well in sec. 14,27-28 east of the field. Federal Drilling Co. found the Vedder zone barren at 2150 ft. in its Glide No. 3 in sec. 13,26-27.

Dilamar, Quinn Well Pumps 100 Bbls. 75%

Climaxing an exploratory campaign by many operators extending over a period of many years and over a wide area, Dilamar Oil Corp. has attained what may be commercial production in the Richgrove area of Kern county. Quinn No. 1, drilled originally by Doyle Petroleum Co. in sec. 15,25-27, is now on the pump making 100 bbls. cutting 75% from the interval 2830 to 2880 ft.

Coastal District

Discover New Field In Cat Canyon Area

Discovery of a new field is credited to Standard Oil Co. with the completion of its Los Flores Land & Oil No. 1 for 550 bbls. of 14.5 gravity clean oil. Located in sec. 27, 9-33 near Cat Canyon, the well was carefully cored to 6556 ft., formation tests being run at frequent intervals after entering the Monterey shale at 5300 ft. Analysis of the cores as well as the drill pipe tests indicated the best production would be found between 5395 ft. where 8⅝-in. casing had been set, and 6440 ft. Accordingly the hole was plugged to the latter point, a perforated liner landed and the well placed on the pump. Several hours were required to exhaust the drilling water, but when the oil finally arrived at the surface, the fluid turned rapidly to oil.

Although deeper, geologically the new field is very similar to Gato Ridge, production coming from the fractured Monterey brown shale. Due to the present weak market for crude of this type, Standard plans to curtail the new well's output as soon as its true capabilities are determined.

Exploration Slows in Santa Barbara Co.

Exploratory work in Santa Barbara county has slowed somewhat in recent weeks, in all probability due to the concentration of men and equipment in Los Angeles basin fields.

On the Santa Barbara Mesa, Anacapa Oil Co. and Trans-Oceanic Oil Co. are working-over old wells, the latter company deepening Morrison No. 1 below 3215 ft. in Sespe.

Near Refugio, A. E. Tweedy deepened his Penn No. 1, sec. 34,5-31, to 2324 ft. and abandoned after finding the Vaqueros wet.

Douglas-Stratton Oil Co.'s Carreaga test in sec. 8,8-33 pumped only water with a small quantity of oil and is now standing idle. The well is 6239 ft. deep and is plugged to 6010 ft.

J. E. O'Donnell resumed operations on Helen No. 1 in sec. 8,7-33, near Lompoc, and is drilling below 3750 ft. Occasional oil showings have been encountered.

In the Los Oliveros area, Continental Oil Co. is preparing to spud in its La Laguna No. 2 and United Western Oil Co. reports that it will do further work on its Bradley No. 1 .

Gen. Pet. Extends Ventura Ave. Field

Indicating that the productive limits of the Ventura Avenue field are by no means established, General Petroleum Corp., Barnard No. 18, on formation test of the interval 7750 ft. to 7865 ft. below the casing shoe, flowed at the rate of 78 bbls. per hour. The oil was 30.6 gravity and cut 5.8% water. During the test much gas was in evidence, maintaining a flow pressure of 450 lbs. Before the well is finally completed, more formation will be opened with the prospect of obtaining an even greater yield.

Within the proved portion of the field, ten wells are now drilling, seven Tide Water Associated and three Shell, while on the east plunge, Lloyd Corp. is drilling its second prospect well below 4500 ft.

Surprise Well At El Capitan

Pleasantly surprised was the Shell Co. when Covarrubias No. 1-27 in the El Capitan field came in flowing 630 bbls. of 21 gravity clean oil through a ¾-in bean. Bottomed at 1320 ft. and not advantageously located, no better than 200 to 300 bbls., pumping, were expected of the well.

Santa Maria Activity Strikes New Low

Striking a new all time low, drilling projects in the lately busy Santa Maria Valley field now number only two, those being routine projects of the companies originally responsible for the field's development. In sec. 26, 10-34, R. R. Bush Oil Co. and Hancock Oil Co. are drilling Bradley Lands No. 3 below the 2950 ft. level and in sec. 21 Union Oil Co., Vicente No. 4 is below 2980 ft.

California Lands No. 3 of Bush and Hancock was recently finished at 4434 ft. with initial production gauging 700 bbls., but Greathouse Oil Co. has had difficulty in completing Fortier No. 1 in sec. 27.

Union Oil Co. abandoned Wheat No. 2, sec. 22, after two nitro shots failed to improve production. Total depth was 3945 ft.

Hancock Swabs Huasna Well

A most important test is now being made by Hancock Oil Co. in its Huasna well, Scherer-Dickes No. 1, located in sec. 30,12-33. Bottomed at 5593 ft. and plugged to 5080 ft., the well is now being swabbed. A combination string of 6⅝-in. casing was hung at 4935 ft. and cemented through perforations at 3800 ft. Perforations are open from the cementing point to the casing shoe. A late report stated the fluid had been lowered to 3250 ft. and was showing a fair amount of oil.

Warns State Oil Men

"Grave danger to California oilfield employment lurks in a reciprocal trade agreement with Venezuela, Rush M. Blodgett, executive vice president of the Oil Producers Agency, warns state oil men. "If Venezuela oil is permitted to enter the United States duty free, which is possible if the trade agreement is reached, it will be practically impossible for producers of California oil, particularly of the lower grades, to compete with the Venezuelan product in the Atlantic market, which will result in the possibility that many California producing areas may be forced into complete shut-downs, with the consequent loss of employment of all field crews now working in those areas," Mr. Blodget points out.

"The United States Department of State has announced that public hearings on the proposed treaty with Venezuela will open on August 15, with permission to interested parties to file briefs extended to August 6. These briefs are to be filed with the Committee for Reciprocity Information, Washington, D. C., and will be considered prior to the reaching of an agreement."

NORTHERN COUNTIES WILDCATS

County	Well	No.	Section	Depth	Status
Colusa	Amerada Pet. Co.,Calif. Lands	1	34, 16-1	6250	Drilling
Glenn	Ohio Oil Co., Willard	1-A	18, 20-2	6014	Testing
Humboldt	The Texas Co., Eureka	2	22, 3-1	7708	Plug 6473-Shut in
Monterey	The Texas Co., Lewis	1	13, 19-5	2158	Drilling
San Mateo	Wilshire Oil Co., Cowell	2	20, 6-5		Location
Solano	Richfield Oil Corp., Potrero	1	10, 4-1	3638	Drilling

COASTAL COUNTIES WILDCATS

Area	Well	No.	Section	Depth	Status
Santa Barbara County					
Carpinteria	Carpinteria Oil Co.	1	32, 4-5	2460	Idle
Carreaga	Douglas-Stratton Oil Co.	1	8, 8-33	6240	Idle
Cat Canyon	Standard Oil Co., Los Flores	1	27, 9-33	6556	Pumping
Coal Oil Pt.	South Crude Oil Co.	191–2	24, 4-29	5510	Abandoned
Gaviota	Gaviota Oil Co., Hollister	1	35, 5-33	3215	Idle
	Wilshire Oil Co., Hollister	1	35, 5-33	4600	Abandoned
Gato Ridge	Barnsdall Oil Co., Mag.	5	9, 8-32	2768	Drilling
	Petrol Corp., Mag.	5–11	9, 8-32	3720	Drilling
Los Olivos	Continental Oil Co., Laguna	2	25, 8-31		Rigging up
	United Western, Bradley	1	15, 7-30	3279	Idle
Lompoc	O'Donnell, J. E. Helen	1	8, 7-33	3710	Drilling
Orcutt	Warren Deuel, Garrett	1	12, 9-34		Rig
San Luis Obispo County					
Edna	Loma Grande Oil Co., Lewis	1	28, 31-13		Rig
Elk Horn	Calif. Pet. Prod. Co.	1	6, 10-24	2210	Idle
	Lee, Harry Defiance	1	7, 32-22	165	Drilling
	Western Plains Oil Co.	1	7, 31-21	4010	Idle
Huasna	Hancock O. Co.,Scherer-Dickes	1	30, 12-33	5593	Testing
Paso Robles	Vanguard Oil Co., Clark	1	26, 27-14	4700	Drilling
Ventura County					
Moorpark	Darby Oil Co., Cohn	1	7, 2-19	4700	Abandoned
Ojai	High Mesa Oil Co.	1	16, 4-22	1700	Redrilling
	Holly Dev. Co., Macrate	1	27, 4-23	4786	Idle
Red Mountain	Martin, J. W.	3	15, 4-21	1250	Drilling
Sespe	McKinnis, Chas., Cosley	1	14, 4-19	675	Drilling
	Merchants Pet., Cochran	8	1, 4-20	865	Drilling
	Speik Oil Co.	1	33, 5-19	3440	Idle
	St. Louis Oil Co.	1	1, 4-20	420	Cleaning out
Sheills Canyon	The Texas Co., Shiells	135	4, 3-19	810	Drilling
South Mt.	Clipper Oil Co.	1	17, 3-20		Rig
	The Texas Co., Richardson	5	13, 2-21	6125	Drilling
Tar Creek	Section 20 Oil Co.	1	20, 5-19	2100	Testing
Timber Canyon	Stallings, Senter, Ahlberg	1	24, 4-21	1445	Testing
Ventura	Ventura Drilling Co.	1	10, 3-23	260	Drilling

Holly Suspends Ojai Test

Failing to find the Vaqueros sand at the expected depth, Holly Development Co. has suspended its Ojai test, Macrate No. 1, at 4786 ft. Fractured cores indicated a fault was encounterd and the operators are considering drilling a second well.

Wilshire Abandons Gaviota Wildcat

After a long series of tests of both the Vaqueros and the Sespe, Wilshire Oil Co. is abandoning its Hollister No. 1 in the Gaviota area east of Pt. Conception. Only marginal showings were encountered to the final depth of 4600 ft.

Vanguard Resumes in San Luis County

Vanguard Oil Co. has resumed operations on its Clark No. 1, located in sec. 26,27-14 near Creston in San Luis Obispo county. Last reported depth was 4700 ft.

Yale Richardson Running Casing

Unable to remove a stubborn fish from bottom of 6125 ft., The Texas Co. is running a protective string of casing in Yale Richardson No. 5 at South Mountain.. Only pipe now in the hole is 13⅜ in. set at 1900 ft. Several possible productive sands were passed by on the way down which the company expects to test before abandoning. ..

New Lead Seal Packer Perfected by Security

The Security Engineering Co., Inc., has recently developed a new type Lead Seal Packer that is extremely simple in its setting action. It requires no twisting or turning to set, has no slips to jam or get out of order, and completely eliminates any danger of setting the packer in the wrong location.

The Security Lead Seal Packer consists essentially of two parts, a Hook Collar and the Packer itself. The Hook Collar is made up at the desired position in the casing string, replacing a regular casing coupling. The Packer has strong springs located around its circumference and so engineered that they cannot possibly catch on the casing couplings while the tool is being lowered in the hole. However, as soon as the Packer reaches the specially formed recess of the Hook Collar the springs instantly expand and lock the Packer against further downward progress. Then, it is only necessary to lower the weight of the run-in string straight downward against the springs, thus expanding the Packer and forming a fluid-tight seal.

When it is desired to remove the Packer only a straight lift is required to pull the springs free and allow it to be quickly withdrawn from the hole.

Circulating Joint

A special Circulating Joint can also be run with the Packer for multiple production work, or wherever it is desired to establish circulation between production strings. This Joint has two long slots on opposite sides of the body, and when the run-in string is lifted straight up these ports are opened, allowing circulation to be established between the inside and outside of the string. When the run-in string is lowered, the Joint telescopes, thus closing the ports and automatically making a fluid-tight seal against a lead ring.

The Security Lead Seal Packer and Circulating Joint are made both in conventional steel construction, and of "Securaloy", the drillable metal. When made of drillable construction, everything except the short spring fingers can be made of "Securaloy", and these springs, being of small size, can either be readily pushed into the walls or picked up with a basket bit from the bottom of the hole when necessary.

The Security Lead Seal Packer and Circulating Joint are available in a wide range of sizes to fit every production need.

The Security Lead Seal Packer and Circulating Joint are available in a wide-range of sizes to fit every production need.

New Line Blind Announced by Hamer

A new, positive shut-off that easily can be opened or closed by one man in less than one minute is now being manufactured by the Hamer Oil Tool Co., 2911 Cherry Avenue, Long Beach. It has been proven by many months of tests, and companies who have tried it have standardized on its use at once.

The line is opened or closed by a blind plate which has a full opening in one end and is blind on the other. This operation is very simple and is accomplished by the use of a bar inserted in the gear head, turning to the left to loosen and right to tighten. Approximately four turns of the gear head will completely release or tighten the blind plate. Leaks are unknown, for the reason that packing is arranged to take a mash tight position as well as a pressure seal tightness.

Hamer Union Line Blinds have been thoroughly tested on butane, gasoline, pressure distillate, kerosene, rotary mud, water and other services, up to 250° F. They are also used in slush pump suction as compound valves. They eliminate the loss of time, line drainage and fire hazards caused by the old method of unbolting flanges, reversing the plate and then, after replacing new gaskets, tightening the bolts to shut off possible leakage.

Made of all steel parts they are practically everlasting. They cannot sand up, as the opening, through the blind is at all times a full hole or a positive shut-off blank—there are no exposed grooves to become clogged. Fluids cannot enter the gear case enclosing the operating parts. Lubrication is through an alemite fitting, protected from damage by a ball race plug.

Hamer Union Line Blinds are made in seven sizes, from 2-inch to 10-inch, with both ends flanged, threaded or scarfed for welding. They are tested under cold water pressure to 2,000 pounds and are recommended for use on working pressures from 1,200 pounds down to nothing and vacuum.

Link-Belt Announces Bond, Dyson Promotions

Link-Belt Co. announces that William W. Bond has been appointed western sales manager of the positive drive division, with headquarters at the Dodge plant in Indianapolis, to succeed G. Howard Burkholder, deceased. Mr. Bond has been in the company's employ since 1911, first serving in the engineering department at the Philadelphia plant. For the last 15 years he has been engaged in the sale of roller chain drives.

William W. Bond

Ralph S. Dyson

Coincidentally with Mr. Bond's promotion, Ralph S, Dyson, for many years manager of stock silent and roller chain drives through distributors, will also head up roller chain sales to duplicate machinery manufacturers. Mr. Dyson entered the company employ in 1899.

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Oil Men's Calendar

September

California Natural Gasoline Assn. meets the first Thursday of each month.

5-9—American Chemical Society, Milwaukee, Wisc.

14-16—Santa Barbara, Calif., annual meeting Pacific Coast Gas Association, Biltmore Hotel.

14-16—National Petroleum Assn., 36th Annual Meeting Hotel Traymore, Atlantic City, N. J.

21-23—National Industrial Advertisers Assn., Inc., 16th Annual Meeting, Cleveland.

27-29—National Assn. of Petroleum Retailers, Annual Meeting, St. Louis, Mo.

27-Oct. 2—The American Assn. of Petroleum Geologists, Mid-Year Meeting, under direction of W. Texas Geological Society, El Paso, Tex.

October

3-4—National Lubricating Grease Institute, 6th Annual Meeting, Chicago, Ill.

6-7—Society of Automotive Engineers, National Regional Fuels & Lubricants Meeting, Tulsa, Okla.

6-7—Petroleum Division A.I.M.E. fall meeting, San Antonio, Texas.

6-8—American Institute of Mining & Metallurgical Engineers, Industrial Minerals Division, Knoxville, Tenn.

10-13—North American Gas Tax Conference, Tulsa, Okla.

10-14—National Safety Congress, Petroleum Section, Stevens Hotel, Chicago, Ill.

10-14—American Gas Assn., Atlantic City, N. J.